

**Resource Guide for
Systems-Based
Sustainability Analysis
of Building 170
Fort McPherson, Georgia**

Submitted to:

Army Environmental Policy Institute

By:

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Tab 1:

Sustainability and the Army

Sustainability and the Army

The Army, as part of the Federal Government of the United States, plays a significant role with respect to built facilities in this country. With millions of square feet of building stock in active use and millions more planned for construction, the Army is among the top ten largest building owners in the United States. Built facility systems are critical to the Army mission in a number of ways: they house troops and their families, provide the foundation for tactical operations, and deliver essential infrastructure support such as power, transportation, water, and solid waste and wastewater treatment and disposal. As a large building owner that relies heavily upon the support and services provided by built facilities, the Army now faces a need to reexamine its building practices to respond to a growing awareness of the negative impacts of built facilities under the current paradigm. The following subsections describe how our understanding of built facilities is changing and discuss the Army's response to those changes in terms of built facility sustainability.

Drivers for Sustainability

Built facilities are complex technological systems that meet critical human needs, persist over significant lengths of time, and involve multiple diverse stakeholders. Their interrelations with the technological and ecological systems that surround them have significant impacts on those systems. These impacts have not always been noticeable on the scale of individual facilities, but their cumulative effects on the planet over time have been increasingly well documented. For example:

- Buildings are responsible for over ten percent of the world's freshwater withdrawals, twenty-five percent of its wood harvest, and forty percent of its material and energy flows (Roodman & Lenessen 1996).
- 54% of U.S. energy consumption is directly or indirectly related to buildings and their construction (Loken et al. 1994).
- 30% of all new and remodeled buildings suffer from poor indoor environments caused by noxious emissions, off-gassing, and pathogens spawned from inadequate moisture protection and ventilation, resulting in \$60 billion annually in lost productivity from Sick Building Syndrome in the U.S. alone (Kibert et al. 1994).
- Nearly one-quarter of all ozone-depleting chlorofluorocarbons (CFCs) are emitted by building air conditioners and the processes used to manufacture building materials (Energy Resource Center 1995).
- Approximately half of the CFCs produced around the world are used in buildings, refrigeration and air conditioning systems, fire extinguishing systems, and in certain insulation materials. In addition, half of the world's fossil fuel consumption is attributed to the servicing of buildings (Zeihner 1996).
- The average household is annually responsible for the production of 3,500 pounds of garbage, 450,000 gallons of wastewater, and 25,000 pounds of CO₂ along with smaller amounts of SO₂, NO_x, and heavy metals (Barnett and Browning 1995).

- Lighting accounts for 20-25% of the electricity used in the U.S. annually. Offices in the U.S. spend 30 to 40 cents of every dollar spent on energy for lighting, making it one of the most expensive and wasteful building features (Energy Resource Center 1995).
- The construction industry is responsible for 8-20% of the total Municipal Solid Waste (MSW) Stream, 14% on average (Tchobanoglous et al. 1993).

These cumulative impacts have resulted in increased attention to the role played by built facilities and infrastructure in the problems of natural resource depletion and degradation, waste generation and accumulation, and negative impacts to ecosystems. Since built facilities are a major direct and indirect contributor to these problems, they now face increasingly restrictive environmental conservation and protection laws and regulations, international standards to address environmental quality and performance, and substantial pressures from civic groups, environmental organizations, and citizens. As a result, facility stakeholders face new, complex and rapidly changing challenges imposed by these laws, regulations, standards, and pressures at all life cycle stages.

Environmental Impact: Negative impacts to natural ecosystems have begun to enter into decision-making in the construction industry. Forced by environmental legislation such as the National Environmental Policy Act of 1970, all significant federal projects now require an Environmental Impact Assessment of the project to be completed before construction can proceed. Still, however, many project planners, designers, and contractors see environmental considerations as an obstacle to be overcome rather than a way to achieve benefits for themselves and others (Kinlaw 1992). Many actions taken to mitigate environmental impact of projects are typically only applied as end-of-the-pipe measures, not changes to the environmentally damaging processes themselves (Liddle 1994). These traditional strategies of mere environmental regulatory compliance or reactive, corrective actions such as mitigation or remediation have proven to be consistently costly, inefficient, and many times ineffective (Vanegas and Pearce 2000).

Resource Depletion and Degradation: Other triggers for change center around resource depletion and degradation. For example, many municipalities have adopted energy codes to promote energy efficiency in new facilities. While not widely enforced, these codes nonetheless represent an evolutionary step for the construction industry. In other cases, increased scarcity of resources such as dimensional lumber have forced the industry to seek alternatives to traditional materials, including engineered wood products, steel framing, recycled plastic lumber, and stress-skin panels. These products make use of materials formerly considered to be waste, including sawdust, post-consumer plastic, and wood pieces too small to be otherwise incorporated as structural members, and result in products that are structurally superior to the materials they replace. Alternative framing practices have also become more commonplace as constructors seek to minimize the use of raw materials. A positive side effect of some of these new trends is increased energy efficiency due to decreased thermal bridging and integrated insulation (BSC 1995).

Human Health: A third trigger for change is the increasingly noticeable impacts of the built environment on human health. Many humans spend most of their time indoors, nearly 90% of an average day (Kibert et al. 1994). Building-related threats to human health include the carcinogenic properties of asbestos and the neurologically damaging

effects of lead-based paint. Yet these products were common components of buildings during the period between 1950 and 1970. More recent evidence supports the carcinogenic effect of low-level electromagnetic radiation, which is generated by all electrical appliances (Rousseau & Wasley 1997). Some individuals are highly sensitive to irritants and/or toxins such as off-gassed volatile organic compounds (VOCs), formaldehyde from adhesives and fabrics, and molds, bacteria, and dust accumulating in and resulting from building products (ibid.). The cleaning and maintenance products used during facility operation, including pesticides, solvents, and chlorine, present another set of irritants that cause reactions in an increasingly large portion of the population. Rousseau and Wasley describe the trend:

The body absorbs an alarming number of these agents, and some accumulate for long periods causing toxic or immune-like reactions. Others mimic chemicals which regulate body functions, causing 'error responses.' Testing requirements for new chemicals may be rigorous, but it is impossible to anticipate all of their potential long-term effects...The financial gain from successful new products makes them very attractive to develop, and creates political pressure to approve them for sale. It is sobering to think that chlorofluorocarbons, DDR and PCBs were all considered 'miracle chemicals' when they were introduced. (1997, p. 14)

Given the complex combinations of materials and chemical products being incorporated into built facilities, the potential of buildings to have negative impacts on human health is significant. The number of potential irritants and toxins is growing rapidly with the proliferation of synthetic chemicals present in almost every product used by humans. Thus, threat to human health is a third significant category of triggers that reflects the need for change in the way built facilities are created and operated, along with the building technologies, systems, products, and materials used within them.

Sustainability and the Architecture/Engineering/Construction (A/E/C) Industry in General

In response to these drivers of built facility evolution, sustainability has emerged as guiding paradigm to create a new kind of built facility: one that meets the needs of humans in the present without limiting the ability of future generations to meet their own needs (after WCED 1987). At present, the industries responsible for the built environment are cost-driven, with minimization of first cost and implementation time as primary objectives, meeting quality and performance goals as secondary objectives, and minimizing negative impacts as a tertiary objective. The shift to a sustainable built environment does not necessarily eliminate these objectives of traditional construction, but rather embeds them in a larger context of sustainability-related life cycle objectives including minimizing negative impacts to resource bases and ecosystems while meeting the needs of stakeholders of the system (Figure 1).

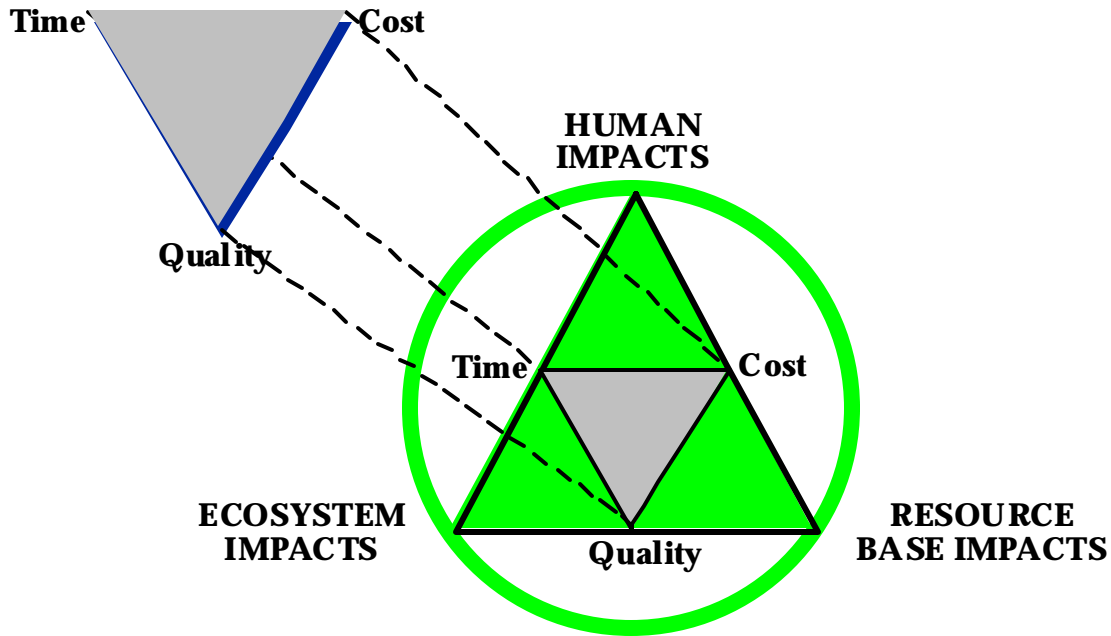


Figure 1: A Paradigm Shift to Sustainable Construction (Pearce 1999)

To realize the potential benefits offered by the new paradigm of sustainability, researchers and practitioners have begun to identify a variety of strategies and actions for improving the sustainability of the built environment. A recent study identified over 4000 different rules of thumb or heuristics in the published literature for increasing built environment sustainability (Jones-Crabtree et al. 1998). These heuristics represent best practices in the industry and span the entire scope of facility scales, types, and life cycle phases, ranging from purchasing energy efficient appliances, to installing water-saving fixtures, to using finish materials that improve indoor air quality. Most of this knowledge is in a non-quantitative form such as “Install low flow fixtures” or “Use low-VOC paints”, with no way to predict which of the many possible actions will have the most significant impact on facility sustainability.

These heuristics represent a fragmented approach to improving sustainability, offering little guidance as to the appropriate context in which to apply them and focusing primarily on specific issues or problems rather than ways to improve facility sustainability holistically. As described further in Chapter 2, a limited number of tools and techniques exist today to compare the environmental, energy, or economic life cycle performance of individual materials, components, or systems within a facility. However, systematic mechanisms to evaluate the sustainability of a facility from an integral perspective and within its specific context, particularly in terms of selecting improvement options, currently do not exist.

Sustainability and the Federal Government

The history of sustainable building initiatives for the Federal government started out with a focus on energy conservation in the 1970’s and gradually moved into a more holistic approach in the 1990’s. Early policy and laws that mark the beginning of the initiative to

make the construction and operation and maintenance of Federal facilities be more environmentally sensitive include:

- Energy Policy and Conservation Act (EPCA) of 1975
- Resource Conservation and Recovery Act (RCRA) of 1976
- National Energy Conservation Policy Act (NECPA) of 1978
- Comprehensive Omnibus Budget Reconciliation Act (COBRA) of 1985
- Federal Energy Management Improvement Act (FEMIA) of 1988
- Executive Order 12759, “Federal Energy Management,” April 17, 1991
- Energy Policy Act of 1992 (EPACT)

With the exception of RCRA, the above Acts and one Executive Order focus in one facet or another on energy. RCRA §6002 established a Federal mandate to “buy recycled” (Sustainable Systems 1997). RCRA §1008 and §6004 require all Federal agencies generating solid waste to take action to recover it (Sustainable Systems 1997). This was one of the first attempts by the Federal government to take a broader perspective of environmental issues.

With the changing of administrations in 1992, the environment became a focal point of the Federal government. During President Clinton’s Earth Day address in 1993, he made a commitment to make the White House “a model for energy efficiency and waste reduction” by calling for an energy and environmental upgrade and retrofit of the White House complex. In order to help the administration meet this promise several additional Executive Orders were passed in 1993 and 1994:

- Executive Order 12843, “Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances,” April 21, 1993
- Executive Order 12844, “Federal Use of Alternative Fueled Vehicles,” April 21, 1993
- Executive Order 12845, “Requiring Agencies to Purchase Energy-Efficient Computer Equipment,” April 21, 1993
- Executive Order 12856, “Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements,” August 4, 1993
- Executive Order 12873, “Federal Acquisition, Recycling, and Waste Prevention,” October 20, 1993
- Executive Order 12902, “Energy Efficiency and Water Conservation at Federal Facilities,” March 8, 1994 (supersedes EO 12 759 from 1991)

Actions that resulted from the President’s request came to known as *The Greening of the White House* (Sustainable Systems 1997). The U.S. Department of Energy’s “Federal Energy Management Program (FEMP) is lead Federal agency for helping transfer the energy and environmental technologies used in *The Greening of the White House* to all Federal buildings” (Sustainable Systems 1997).

As previously discussed, Executive Orders have been used since the early 1990's in an effort to change federal governmental practice to be more environmentally friendly. The majority of initiatives taking place in sustainable building currently are fueled by the need to comply with the current Executive Orders issued by the Office of the Federal Environmental Executive (<http://www.ofee.gov>) (OFEE). The mission of OFEE is to advocate, coordinate, and assist environmental efforts of the Federal community in waste prevention, recycling, the affirmative procurement of guideline items and the acquisition of recycled and environmentally preferable products and services. The most recent group of Executive Orders focused on environmental issues include:

- Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," September 14, 1998.

This order strengthened and replaced an earlier order, **EO 12873** (1993), "*Federal Acquisition, Recycling and Waste Prevention*."

- Executive Order 13123, "Greening the Government Through Efficient Energy Management," June 8, 1999.

This order strengthened and replaced several executive orders including **EO 12902** (1994), "*Energy Efficiency and Water Conservation at Federal Facilities*" and **EO 12845** (1993), "*Requiring Agencies to Purchase Energy Efficient Office Equipment*." Also note that EO 12902 previously replaced **EO 12759** (1991) "*Federal Energy Management*." **Executive Order 13123** (1999) directs Federal agencies to apply the principles of Sustainable Design to the siting, design and construction of new facilities. The Executive Order also directs agencies to optimize life-cycle costs, reduce pollution prevention and other environmental and energy costs associated with the construction, life-cycle operation, and decommissioning of facilities.

- Executive Order 13148, "Greening the Government Through Leadership in Environmental Management," April 22, 2000.
- Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," April 22, 2000.
- Executive Order 13150, "Federal Workforce Transportation," April 22, 2000.

In addition, the OFEE issued, "Greening the Government: A Report to the President on Federal Leadership and Progress" on April 22, 2000 (<http://www.ofee.gov/html/greening2.pdf>) which covers implementation of several Executive Orders and provides additional resources for more information.

Executive orders are just that – orders. They do not provide implementation guidelines that tell federal agencies how to comply with the Executive Order. In addition, they do not have penalties associated with them for non-compliance. Unless an agency takes the initiative to follow-up on documentation of compliance with the Executive Orders and whether they are being followed, there is no incentive for employees to meet the requirements in the Executive Orders. Hence, several Federal agencies have taken the next step of adopting policies and implementation guidelines for sustainability and/or environmental issues. Below is a brief summary of the Federal Agencies that have

policies or guidelines focused on sustainability and green building issues. For a full listing of current Federal Resources please refer to Attachment A.

- **Department of Commerce, National Institute of Standards and Technology (NIST)**

The majority of work NIST is working on is related to determine the economic and environmental performance of building products (BEES software).

- **Department of Defense**

- Air Force

The Air Force Center for Environmental Excellence (AFCEE) has taken the lead within the Air Force on the sustainability initiative. AFCEE has developed a wealth of resources to help the Air Force move forward in their sustainability quest including guidance documents, assessment tools and example projects. Their web site

(<http://www.afcee.brooks.af.mil/green>) includes links to all of their resources.

The “United States Air Force Environmentally Responsible Facilities Guide” published in June 1998 is the leading guidance document currently used in the Air Force. The Air Force also has documents in the following general categories, which address sustainable development: sample “greened” specification, fact sheets, contract documents (i.e. sample “greened” statement of work), and toolboxes.

Assessment tools being developed in the Air Force currently include the Green Base of the Future (GBOF) initiative and the LEED Application Guide for Lodging.

Example projects include family housing (Vandenberg AFB, CA), a squadron facility (Seymour Johnson AFB, NC), a fire station (Homestead ARB, FL) and a solid waste and recycling facility (Vashon Transfer/Recycling Station, King County, WA).

- Navy

The Navy published three Planning and Design Policy Statements on June 18, 1998 (98-01 through 98-03) that focused on the design and construction of sustainable facilities and infrastructure. The next step the Navy is currently developing will move the Navy from policy into implementation. The Whole Building Design Guide (<http://www.wbdg.org>), when complete, will provide users with guidance and resources to implement sustainable design.

- Marine Corps

The Marine Corps initiated their sustainability activities in an effort to develop an Environmental Management Systems. Camp Lejeune, North Carolina completed an “Environmental Sustainability Study” in January 2000. Currently they are developing an Environmental Sustainability

Guidance Manual that will include a blueprint for sustainable development (a roadmap) for the next 25-50 years.

- Multi Service

The 1999 “Sustainable Planning: A Multi-Service Assessment” was the first attempt at laying a baseline for sustainable development for the Department of Defense as a whole. Currently, the services are looking at the feasibility of implementing universal design guidelines that includes sustainable building concepts.

- **Department of Energy, Federal Energy Management Program (FEMP)**

The FEMP is the leader in federal initiatives for energy efficiency and alternative energy sources. FEMP has established programs that can help federal agencies implement energy concepts into their projects and have developed a resource guide (“Greening Federal Facilities Resource Guide”).

- **Department of Housing and Urban Development**

The Department of Housing and Urban Development (HUD) has a primary interest in providing assistance through the “Rebuild America” program. One of the ways to do this is through sustainable development principles. They have also produced “A Guide to Deconstruction” which is one facet of green building.

- **Environmental Protection Agency**

The Environmental Protection Agency’s (EPA) mission “to protect human health and to safeguard the natural environment.” The EPA has programs that support sustainable development including but not limited to Community-Based Environmental Protection (CBEP) and brownfields. In addition, EPA Region III had formed a Center for Sustainability in an effort to link EPA’s environmental protection efforts with larger economic and social goals.

- **General Services Administration**

The General Services Administration (GSA) has a green initiative called Planet GSA with five pillars including purchasing, transportation, construction, management, and saving. In addition, GSA developed the “Real Property Sustainable Development Guide” that looks at the basic principles of sustainable development and provides resources and case studies for each. GSA’s publication “Real Property Policysite” typically includes sustainability issues in each volume.

- **National Park Service**

The National Park Service’s (NPS) policy statement on sustainable development is included in their “Guiding Principles of Sustainable Design” publication. NPS also created and updates the “Sustainable Design and Construction Database” that has approximately 1300 product listings from over 550 manufacturers, listings of over 7000 recyclers of construction debris nationwide, and expanded listings of books, periodicals, organizations, and on-line sources of sustainable information.

The Army's Response to Sustainability Drivers

Within the Federal Government, the Army has responded to the need for change in several notable ways. On January 31, 2000 the Department of the Army, U.S. Army Corps of Engineers (Corps) issued Technical Letter No. 1110-3-491 "Sustainable Design for Military Facilities" which provides "basic criteria and information pertaining to the incorporation of sustainable design concepts in the design and construction of Military facilities." The technical letter "applies to all HQUSACE elements and USACE commands having Army military construction and design responsibility."

According to this Technical Letter "the overall USACE goal of Sustainable Design is to be environmentally responsible in the delivery of facilities." It identifies the need to blend traditional construction goals of cost, quality and time with ecological and human health impacts. The Technical Letter sets forth "goals for improving the environmental performance of facilities" include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource reuse, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value, and (f) protect, and where appropriate, restore the natural environment. The letter further stresses that the identification of environmental goals and requirements should be implemented during the design process and included in the project development document. Two other goals and objectives discussed in Technical Letter No. 1110-3-491 are budgeting for environmental and energy-efficient equipment, systems, and design solutions using life cycle cost assessment (LCCA) methods and establishing a solar amount in the budget to fund passive and/or active solar strategies.

The remainder of the Technical Letter describes the project phases and considerations that can be changed in order to meet the Army's sustainable design initiative. The parts detailed include:

- Project Design Team
- Planning and Site Selection
- Site Development
- Sustainable Design and Construction of the Built Environment
- Maximizing User Health and Productivity
- Designing for Energy Efficient Operation
- Management of Water as a Limited Resource
- Resource-Efficient Materials in Design and Construction
- Green Building Rating System: Leadership in Energy and Environmental Design (LEED)

"In order to institutionalize sustainable design into Corps design procedures, they are revising current construction guide specifications (CGS) which are used to design and

construct military projects. The project is called Green Building Criteria Update Program (GBCUP). Currently, the Corps has completed, or are finalizing, “nearly 60 CGS and approximately 30 technical/engineering manuals, engineering technical letters and instructions, covering sustainable design principles.”

One example of implementing sustainable development techniques at the installation-level comes from Forces Command (FORSCOM). FORSCOM is implementing environmental master planning at the installation level. This effort is lead by Ms. Manette Messenger of FORSCOM headquarters. The focus of the environmental master plan is pollution prevention. It is a way to integrate environmental issue with the Army’s mission. The plan includes a baseline assessment that answers questions such as 1) What are the impacts?, 2) Which are significant?, 3) Which can we prevent, and 4) Which do we manage? After a baseline is established for the post, a plan is developed that sets 25-year goals but includes five-year resource plans. The goals are long-term because most people can agree on what they want the future to be. Examples of 25-year goals include 90% reduction in aquifer use, 75% reduction in air emissions, buildings rated at LEED platinum levels. The entire process is a consensus-building process driven at the installation level, as the baseline and goals for each installation will be different. To date, nine of the eleven FORSCOM installations are in the processing of preparing an environmental master plan.

Another example of the Army’s sustainability initiative includes the development of a sustainability assessment tool. Sustainable Project Rating Tool (SPRT) Version 1.2 developed by the U.S. Army Corps of Engineers (Corps), Engineer Research and Development Center (formerly known as CERL) is a customization/adaptation of the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED). It is a draft tool to rate the sustainability of Corps projects that are under development and is proposed for use throughout DOD. SPRT was devised because the Corps felt commercial rating tools did not reflect military issues. SPRT goes beyond the traditional green strategies (sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality) by adding life-cycle synergy concepts including facility delivery process, current mission and future mission.

Attachment B provides a list of sustainable facility-related documents developed by or for the Army. These resources are a point of departure for the project being examined in this study.

Attachment A.

Federal Resources for Built Environment Sustainability

The Sustainable Facilities & Infrastructure (SFI) project team at Georgia Tech Research Institute compiled this list of federal resources in November 2000. It is meant to be a preliminary and working list and will updated as new documents become available.

Department of Commerce

National Institute of Standards and Technology

- Fuller, Sieglinde K. and Peterson, Stephen R. (1995). "Life-Cycle Costing Manual for the Federal Energy Management Program (NIST Handbook 135)." U.S Department of Commerce, Technology Administration, National Institute of Standards and Technology.

"Handbook 135 is a guide to understanding the life-cycle cost (LCC) methodology and criteria established by the Federal Energy Management Program for the economic evaluation of energy and water conservation projects and renewable energy projects in all federal buildings...The purpose of this handbook is to facilitate the implementation of the FEMP rules by explaining the LCC method, defining the measures of economic performance used, describing the assumptions and procedures to follow in performing evaluations, giving examples, and noting NIST computer software available for computation and reporting purposes."

- Lippiatt, Barbara C. (2000). "Building for Environmental and Economic Sustainability (BEES) 2.0"

The Building for Environmental and Economic Sustainability (BEES) software provides a technique for balancing the environmental and economic performance of building products by using the environmental life-cycle assessment approach specified in ISO 14000 standards. The software is "aimed at designers, builders, and product manufacturers, and includes environmental and economic performance data for 65 building products." A free download of the software is available at www.bfrl.nist.gov/oae/bees.html.

Department of Defense

Air Force

- Air Force Center for Environmental Excellence (AFCEE) for the Texas Pollution Prevention Partnership, “Guidance for Greening Military Installations (GBOF 50% Guide).” March 9, 2000.
- Air Force Center for Environmental Excellence (AFCEE), “Green Base of the Future.”
- “Green Base of the Future Model Guide Charrette (11-12 January 1999).”
- “Green Base of the Future Charrette II (1-2 December 1999).” January 5, 2000.
- Blevins, Roger. “White Paper: Sustainable Planning and Development Guide.” Air Force Center for Environmental Excellence (AFCEE). March 21, 1999.
- Air Force Center for Environmental Excellence, Environmental Quality Directorate, “AFCEE Environmental Quality Resource CD (Version 5.0),” August 2000.

Sustainable Development Resources (<http://www.afcee.brooks.af.mil/green/>)

This newly designed web site includes numerous resources broken down into the following categories:

Auditing Checklists

- EPA Pollution Prevention and Environmental Impact Reduction Checklist for Buildings and Housing Construction

Brochures

- Environmentally Sustainable Construction Brochure - An overview of the USAF Environmentally Responsible Facilities Guide.

Educational Materials

- This section includes case studies of sustainable development both internal and external to the Air Force, sample specification documents, and presentation briefings on affirmative procurement and environmental issues.

Environmental Programs

- This section has a link to the EPA’s Comprehensive Procurement Guideline (CPG) Program.

Fact Sheets

- Includes fact sheets on carrying capacity, CERL, EPA’s CPG program, NREL housing project, and PRO-ACT.

Guidance Documents

- C&D Waste Management Guide - Self-extracting zip file that contains the guide in pdf format and Excel spreadsheets that serve as an Attachment.

- “United States Air Force Environmentally Responsible Facilities Guide.” June 1998 - A resource for Air Force project teams moving toward sustainability, written by a team including engineers, architects and environmental specialists.

Handbooks - This section provides links to the following documents:

- ACC Sustainable Facilities Guide
- GSA Real Property Guide (GSA)
- MIL-HDBK-1165, Water Conservation
- Sustainable Building Technical Manual
- Whole Building Design Guide (Navy)

Information Services

- This section provides links to many private and public resources external to the Air Force.

Regulatory Drivers

- Discusses AFI 32-7080 in Adobe Acrobat format.

Sample Plans

- This section has a link for the Integrated Resource Plan in Microsoft Word format and for the Waste Management Spreadsheet in Microsoft Excel format.

Sample Statements of Work

- Provides a sample statement of work for A-E Sustainable Design as well as a Sustainability Consultant in a Microsoft Word document format.

Toolboxes

- Sustainable Development Toolbox - The Toolbox is an expanded version of the Resource List from the USAF Environmentally Responsible Facilities Guide, including a brief description of each resource and links to web sites where available.

Design and Construction Resources

(<http://www.afcee.brooks.af.mil/DC/products/DCproducts.asp>)

- Design-Build Guide
- The U.S. Air Force Project Manager’s Guide for Design and Construction (Blue Book)
- The U.S. Air Force Project Manager’s Guide for Project Definition (Red Book)
- The U.S. Air Force Project Manager’s Guide for A-E Services Acquisition and Tutorial, 1996 (Orange Book)
- Generic Requirements Document & Project Management Plan

Environmental Conservation & Planning Resources

(<http://www.afcee.brooks.af.mil/ec/ecproducts.asp>)

This link has information and resources on environmental impact analysis process (EIAP) services, planning, natural and cultural resources services, noise, and air quality.

The “Air Force Multimedia General Plan Guide” has numerous on-line references available at <http://www.afcee.brooks.af.mil/mmgpg/pages/reference/ref.htm>. The following is a list of potentially applicable documents:

- Air Force Interagency and Intergovernmental Coordination/Environmental Planning
- Area Development Planning Bulletin
- Comprehensive Planning Approach and Process
- Environmental Quality Protection Bulletin
- Land Use Planning Bulletin
- Passive Solar Handbook – Volumes 1, 2 and 3
- Quality of Life Planning Bulletin
- Transportation Planning Bulletin

Affirmative Procurement Resources

(<http://www.afcee.brooks.af.mil/eq/programs/progpage.asp?rbox=False&type=program&groupcode=0&progid=1>)

This web page covers all the Air Force resources on affirmative procurement. Resources are broken down into the following categories brochures, educational materials, environmental programs, fact sheets, guidance documents, information services, regulatory drivers, sample plans, and sample statements of work.

Marine Corps

- CH2MHill, “Environmental Sustainability Study: Data Development Technical Memorandum, Marine Corps Base, Camp Lejeune, North Carolina,” January 2000. Prepared for U.S. Army Corps of Engineers – Mobile District.

Multi Services

- EDAW. “Sustainable Planning: A Multi-Service Assessment 1999.” Prepared under contract to Naval Facilities Engineering Command, Washington, D.C.
This report covers implementation of several Executive Orders and provides additional resources for more information.
- “Joint Service Pollution Prevention Technical Library Software System (Version 4.0),” August 2000. Maintained by: Naval Facilities Engineering Service Center, Port Hueneme, CA.

- Peterson, K. L. and J. A. Dorsey, "Roadmap for Integrating Sustainable Design into Site-Level Operations (PNNL-13183)," March 2000. Prepared for the U.S. Department of Energy under contract by Pacific Northwest National Laboratory.

Navy (http://www.efdlant.navfac.navy.mil/Lantops_15/sustainable_design.htm)

- Planning and Design Policy Statement 98-01, "Design of Sustainable Facilities and Infrastructure," dated 18 June 1998.
- Planning and Design Policy Statement 98-02, "Criteria Supporting the Design of Sustainable Facilities and Infrastructure," dated 18 June 1998.
- Planning and Design Policy Statement 98-03, "Procurement of Sustainable Facilities and Infrastructure through Architect-Engineer (A/E) Contracts," dated 18 June 1998.
- The Whole Building Design Guide (<http://www.wbdg.org/mtext.html>)

This web site has been primarily supported by the NAVFAC Criteria Office. The web site is still under construction, however, the interim version provides users with guidance and resources on Sustainable Design. Eventually users will be able to access building information via three major categories design criteria, building types and products and systems.

- Navy Environmental Leadership Program, "Program Guide 2000 (CD ROM)." Contact Cheryl Mitchell, Mayport NELP, 904-270-6730, cmitchell@nsmayport.spear.navy.mil
- Naval Facilities Engineering Service Center, "Environmental Solutions", Environmental Restoration Interactive CD Version 3.0, February 2000.

Department of Energy (DOE) (<http://www.eren.doe.gov>)

"The Department of Energy (DOE) contributes to the welfare of the Nation by providing resources to achieve efficiency in energy use, diversity of energy sources, a more productive and competitive economy, improved environmental quality, and a secure national defense. DOE provides scientific and technical information, and educational resources to Federal agencies and the public." Within the DOE, the "Office of Energy Efficiency and Renewable Energy leads the Nation to a stronger economy, a cleaner environment, and a more secure future through the development and deployment of sustainable energy technology."

The Federal Energy Management Program (<http://www.eren.doe.gov/femp/greenfed/>)

The Federal Energy Management Program (FEMP) within the Office of Energy Efficiency and Renewable Energy is the lead agency in several Federal "greening" initiatives including the production of documents, the development of new initiatives, and the execution of greening projects. These initiatives concern energy efficiency, the environment, and the green of dollar savings. The following is a list of initiatives that FEMP has undertaken:

- Green Energy Parks - “Making the National Parks a showcase for a sustainable energy future. Information on the new, joint DOE-DOI initiative for the National Parks.”
- The Greening of the White House Report - “Summarizes progress made towards energy efficient goals and gives an overview of new energy-saving opportunities at the White House.”
- Greening Federal Facilities Overview - “A brief explanation of "greening" and a look at how FEMP can help agencies with these projects.”
- Greening Federal Facilities Resource Guide - “A resource guide to help Federal facility managers reduce energy consumption and costs, improve working environments, and reduce the adverse environmental impacts of their operations. Look for an updated version of this guide.”
- Greening Toolkit - “A Web-based Greening Toolkit of resources for Federal facility managers is currently under development.”

In addition, FEMP has initiated several projects including the White House, The Presidio, and DOE headquarters. The following is a brief list of publications published by FEMP:

- Pacific Northwest Laboratory. (1999). “Architect’s and Engineer’s Guide to Energy Conservation in Existing Buildings, Volume 1 – Energy Use Assessment and Simulation Methods (DOE/RL/0183OP-H4).” DOE, FEMP.
- Pacific Northwest Laboratory. (1999). “Architect’s and Engineer’s Guide to Energy Conservation in Existing Buildings, Volume 2 – Energy Conservation Opportunities (DOE/RL/0183OP-H4).” DOE, FEMP.
- FEMP. (1996). “Greening of DOE Headquarters: An Action Plan for Success,” April 22, 1996.
- FEMP. (1998) “The Greening of the U.S. Department of Energy Headquarters Washington, D.C.: Second-Year Status Report (DOE/EE-0169),” April 22, 1998.
- FEMP and the U.S. National Park Service. (1996). “Greening of the White House: Second Annual Report (DOE/EE-0093).”
- Sustainable Systems. (1997). “Greening Federal Facilities: An Energy, Environmental, and Economic Resource Guide for Federal Facility Managers (DOE/EE-0123).” FEMP
- ENSAR Group. (2000). “Greening of Federal Facilities: Workshop Manual, April 18, 2000, Dallas, TX.” DOE, NREL.

Department of Housing and Urban Development

- NAHB Research Center. (2000). “A Guide to Deconstruction.” U.S. Department of Housing and Urban Development, Office of Policy Development and Research, Washington, D.C.

Environmental Protection Agency

- EPA, Environmentally Preferable Purchasing Program. (1999). “Defending the Environment At the Department of Defense: Using Environmentally Preferable Purchasing Procedures to Maintain the Pentagon and Other DOD Facilities (EPA 742-R-99-002).”
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General Services Administration

(general - www.gsa.gov; Real Property, Sustainable Development - <http://policyworks.gov/org/main/mp/library/policydocs/sustain.htm>)

- U.S. General Services Administration, Office of Government Policy, Office of Real Property. “Real Property Sustainable Development Guide.” The printable version is available at <http://policyworks.gov/org/main/mp/library/policydocs/gsapubfinal2.pdf>
- Real Property Polycysite, Spring 2000

This issue highlights the June 20, 2000 SUSTAINABILITY 2000 WORKSHOP, sponsored by the Office of Real Property, which featured experts on sustainable development such as William McDonough, FAIA, and Ray Anderson, Chairman and CEO of Interface, Inc., and Sandy Mendler, AIA, CUH2A. It is available on-line at <http://policyworks.gov/org/main/mp/library/policydocs/spring2000.pdf>

- Real Property Polycysite, Winter 1999/2000

Featuring cutting edge information on Federal sustainable development principles to help make sound, "green" business decisions for the year 2000 and beyond to benefit tenants and the environment. It is available online at <http://policyworks.gov/org/main/mp/library/policydocs/newsletterwinter99-00.pdf>.

The Planet GSA home page at <http://www.gsa.gov/planetgsa/> has links to the five Planet GSA Pillars including 1) buy green, 2) drive green, 3) build green, 4) manage green and 5) save green.

National Park Service

- “Guiding Principles of Sustainable Design” Available online at <http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html>.
- Sustainable Design and Construction Database – Release 2.0 (<http://www.nps.gov/dsc/dsgncnstr/susdb/>)

Release 2.0 of the National Park Service's Sustainable Design and Construction Database. Improved features of Release 2.0 include updated and greatly expanded contents, improved search options for sorting through the data, and a reduction in the amount of hard drive space required to house the database. The Database now has approximately 1300 product listings from over 550 manufacturers, listings of over 7000 recyclers of construction debris nationwide, and expanded listings of books, periodicals, organizations, and on-line sources of sustainable information.

National Research Council, Board on Infrastructure and the Constructed Environment, Federal Facilities Council

- The Federal Facilities Council. (2000). "Sustainable Federal Facilities: A Guide to Integrating Value Engineering, Life Cycle Costing, and Sustainable Development (Federal Facilities Council Technical Report # 142)." National Academy Press, Washington, D.C.

Office of the Federal Environmental Executive (<http://www.ofee.gov/>)

The mission of the OFEE is to advocate, coordinate, and assist environmental efforts of the Federal community in waste prevention, recycling, the affirmative procurement of guideline items and the acquisition of recycled and environmentally preferable products and services. The web site contains links to Executive Orders, publications, and web links centered on waste prevention.

- Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," September 14, 1998.

This order strengthened and replaced an earlier order, **EO 12873** (1993), "*Federal Acquisition, Recycling and Waste Prevention*."

- Executive Order 13123, "Greening the Government Through Efficient Energy Management," June 3, 1999.

This order strengthened and replaced several executive orders including **EO 12902** (1994), "*Energy Efficiency and Water Conservation at Federal Facilities*" and **EO 12845** (1993), "*Requiring Agencies to Purchase Energy Efficient Office Equipment*." Also note that EO 12902 previously replaced **EO 12759** (1991) "*Federal Energy Management*." **Executive Order 13123** (1999) directs Federal agencies to apply the principles of Sustainable Design to the siting, design and construction of new facilities. The Executive Order also directs agencies to optimize life-cycle costs, reduce pollution prevention and other environmental and energy costs associated with the construction, life-cycle operation, and decommissioning of facilities.

- Executive Order 13148, "Greening the Government Through Leadership in Environmental Management," April 22, 2000. (<http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/2000/4/24/10.text.2>)
- Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," April 22, 2000. (<http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/2000/4/24/9.text.2>)
- Executive Order 13150, "Federal Workforce Transportation," April 22, 2000. (<http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/2000/4/24/8.text.2>)
- "Greening the Government: A Report to the President on Federal Leadership and Progress," April 22, 2000. (<http://www.ofee.gov/html/greening2.pdf>)

This report covers implementation of several Executive Orders and provides additional resources for more information.

- FAR 36.601-3 – Applicable Contracting Procedures

Attachment B.

Army Resources for Built Environment Sustainability

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- Southface Energy Institute. (2000b). "Sustainable Design Alternatives for Adaptive Re-use of Historic Structures: Case Study on Building 170, Fort McPherson, Georgia (Final Report)"
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Tab 2

Sustainability Analysis of Built Facilities

Sustainability Analysis of Built Facilities

This document provides a derivation of the definition of sustainability as it can be applied to built facilities, extending the discussion of sustainability in the main part of the project report. The document presents a derivation of sustainability in operational terms, establishes criteria that define the sustainability of built facilities, discusses the role of sustainability with respect to project life cycle and stakeholders, describes approaches for achieving sustainability in capital projects, and concludes with a discussion of the approach for systems-based sustainability analysis used in this project.

Operationally Defining Sustainability

In laying the foundation for this study, development of a clear operational definition of sustainability is necessary as the basis for all further analysis. This section examines the fundamental properties of systems and their constraints that can be used to define sustainability at a general systems level.

Thermodynamic Constraints

In order for any system to be sustainable, there must be no net loss of the sum total of matter and energy circulating within the system. Such a state is possible for the system defined as Earth, since energy lost as thermal radiation from the Earth can be offset by solar radiation absorbed from the sun.

In addition to conservation of matter and energy, the state of entropy within the system must be stable in order for the system to survive into perpetuity (Georgescu-Roegen 1971). Entropy is the degree of disorder of a system, and is usually the inverse of the potential usefulness something has for humans. For example, an unlit match has lower entropy and higher potential usefulness than a match which has already been lit and extinguished. By lighting the match, we as humans can make use of its potential energy; however, as the match is lit and extinguished, its entropy increases irreversibly - it is impossible to unlight a match.

In all systems, entropy increases with every expenditure of energy, and can only be offset in one system by a greater sacrifice of entropy in some other system; therefore, the net entropy of the universe is continually increasing toward a state of disorder (Van Wylen & Sonntag 1985). For the Earth system, however, the potential exists for the amount of energy received by Earth from the sun to exceed the amount of energy lost as thermal radiation (the difference is commonly called the solar energy budget), and can be used to offset increases in entropy resulting from transformations of matter and energy within the Earth system. Thus sustainability is theoretically possible for the system defined as Earth, as long as the inhabitants of Earth consume less energy than supplied by the solar energy budget. To remain within this budget (described quantitatively by Vitousek et al. 1986), two global objectives of sustainability can be identified:

- **Ecosystem Degradation:** Minimize degradation of natural ecosystems (since they are the mechanism for capturing the solar energy budget via photosynthesis)
- **Resource Consumption:** Minimize the gain in entropy as a result of consumption-related processes.

These basic physical constraints represent limits within which actions on Earth must remain in order to be sustainable.

The Human Component

In describing how humans are affected by actions to increase sustainability, it is necessary to consider issues of inter-generational (between generations) and intra-generational (within generations) equity (WCED 1987), as well as the self-interest of those whose task is to achieve sustainability. Three basic objectives can be identified:

- **Motivation for Initiators:** Maintain standards of living at least as high as the ones that currently exist
- **Intergenerational Equity:** Leave the Earth in at least as good a condition as it presently exists
- **Intragenerational Equity:** Bring everyone else up to at least a decent standard of living.

The first of these goals, maintain standards of living at least as high as the ones which currently exist, is borne of practical considerations. By definition, no rationally self-interested person will voluntarily sacrifice his or her own standard of living without some compensating benefit of equal or greater utility (Simon 1983). Moreover, reliance on such constructs as conscience or guilt to motivate human behavior to become more sustainable is unwise, since such motives tend to be generally unreliable and often self-extinguishing (Hardin 1968, 1993). Therefore, in order to foster acceptance of any proposal for sustainability, assurances must be included that those who change their lifestyles to achieve sustainability will benefit as a result of their commitment.

The second goal, leave the Earth in at least as good a condition as it presently exists, is aimed at achieving intergenerational equity. By leaving the Earth as good as or better than at present, decision makers ensure that future generations will not only have the same set of resources with which to work, but also the accumulated body of lessons learned that humans have developed as a result of our life experiences. The phrase *at least as good* has been interpreted in various ways in the sustainability literature, ranging from leaving the nonrenewable resource base completely unchanged from its present state (as discussed in Daly 1994), to using nonrenewable resources as necessary provided that adequate substitutes are created (e.g., Solow 1993; Mikesell 1992). Adopting the more conservative view described by Daly, the ultimate goal should be to strive to leave resource bases and natural ecosystems as unchanged or improved as possible while working toward achieving the first and third goals.

The third goal, bring everyone else up to at least a decent standard of living, is concerned with the issue of intragenerational equity. In defining what comprises a decent standard of living, this paper stipulates the interpretation of Liverman et al. with respect to setting a threshold of acceptability: survival of the human species “with a quality of life beyond mere biological survival” (1988, p. 133). To what level beyond mere biological survival is a question that is largely culturally dependent. In situations where the biological survival of human individuals is currently infeasible, taking action to improve living conditions to the point of survival is a first step toward intragenerational equity. In other

situations such as in developed countries, living standards are generally far above the minimum required for basic human survival, and fall under the first constraint discussed earlier: Motivation for Initiators.

Achieving intragenerational equity is important not only because of ethical considerations for the welfare of people in developing nations, but also because humans cannot hope to develop common goals and a coordinated course of action for achieving sustainability when people are concerned for their very survival and lacking in basic human rights (Jacob 1994). Common goals and coordinated action are required to achieve sustainability because no action within the Earth system is entirely without ramifications for other entities and processes in the system. Due to the contextual nature of sustainability, actions which seem rational and sustainable to one party acting in isolation may actively conflict with the rational actions of other parties in the interconnected real world (DuBose 1994; Hodge 1995; Cernea 1993). Thus, global objectives and cooperative actions are needed to reach a state of sustainability, and achieving some degree of intragenerational equity is essential to elicit that cooperation (Ruckelshaus 1989; Mink 1993).

Having examined the fundamental constraints and objectives of sustainability in general, this document focuses on introducing the reader to the concept of sustainability as it applies to built facility systems. Basic constraints of sustainability are derived in terms of facility flows and impacts (based on Pearce 1999), and a philosophy of improving sustainability is developed in terms of the notion of locus of control. Two approaches to incorporating sustainability into capital projects are compared—prescriptive vs. performance-based standards—and strategic entry points for sustainability in the capital project delivery process and life cycle are identified (based on Vanegas & Pearce 2000). The document concludes by describing the systems-based sustainability analysis process to be developed in the research as a means for identifying sustainability improvement opportunities, making recommendations, and developing a research agenda for new building-related sustainability technologies and strategies.

Sustainability Criteria for Built Facility Systems

This section examines the parameters that can be used to define sustainability, identifies key thresholds that represent the boundary between sustainability and unsustainability for a system, and describes a decision space using the parameters as dimensions that can be used to represent the relative sustainability of facility systems.

Built Facility Systems from a Sustainability Standpoint

In the context of this study, the built environment is conceptualized as the set of all facilities constructed by humans to meet their needs and aspirations. Each facility, in conjunction with its users and site, can be considered as a system, defined as “a set of elements standing in interrelation” (von Bertalanffy 1968, Churchman 1979). Facility systems can then be defined as the set of physical elements (foundations, structure, enclosure, finishes, etc.) comprising a built facility, the site on which it stands, plus the stakeholders who impact or are impacted by the existence of the facility. So defined, facilities meet the definition of systems and exhibit the properties of (Zandi 1993, Zandi 1986): emergence (the system as a whole has properties which its parts by themselves do

not); hierarchical organization (where the elements that comprise the system themselves are comprised of other sub-elements, each with different levels of emergent properties); communication (the transfer of matter, energy, or information among system elements that permit the system as a whole to function); and control (the ability of the system to perform and maintain its integrity under different conditions or demands).

Figure 1 illustrates the elements that comprise a typical facility system, including site, users, and structures. The boundary of the system is conventionally selected to be the legal boundary of the site; however, in the case of a facility on a military installation, the political boundary of the site is typically the boundary of the installation itself—no legal differentiation among sites for individual facilities is made. Therefore, in the case of a facility on a military installation, delineation of the site boundary is somewhat arbitrary. The specific boundary selected for systems analysis of Building 170 is described in more detail in the *Method* and *Results* sections of the project report, and is based on site boundaries chosen in previous studies of the building.

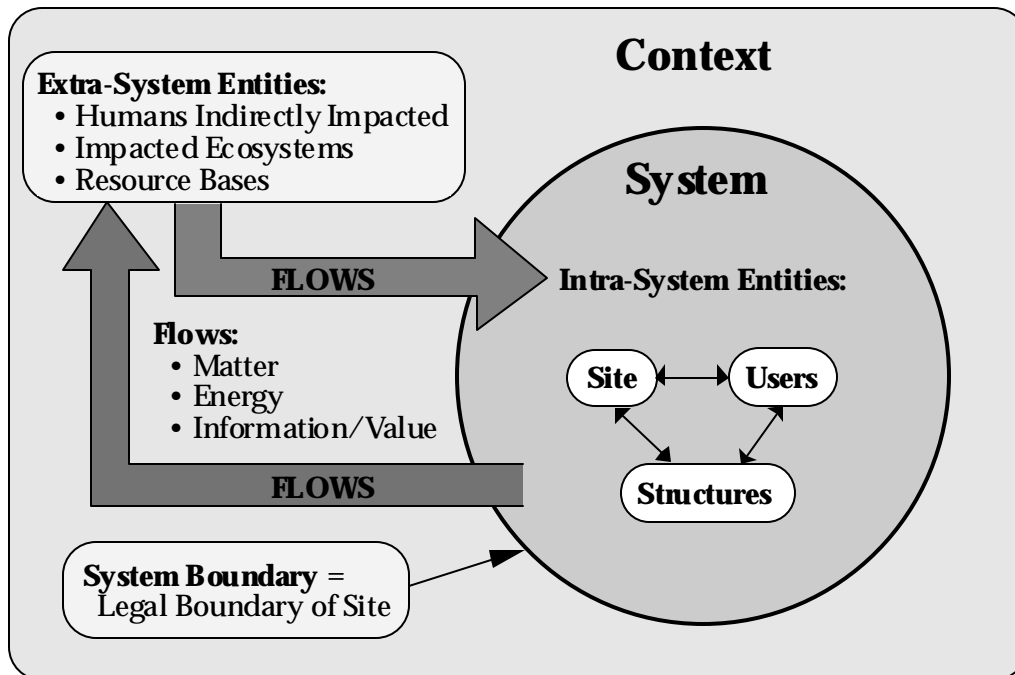


Figure 1: Entities and Flows of a Built Facility System (after Yeang 1995)

Built facility systems interact with their context via the flows of matter, energy, and/or information/value across the boundary of the site. Built facilities are not independent of other systems; they could not exist without complementary technological and ecological systems to provide sources of matter and energy as inputs, and sinks, consumers, or storage for system outputs. As such, built facility systems are open systems, i.e., systems

that exchange matter or energy with their environment (von Bertalanffy 1968, Churchman 1979). The primary links between built facility systems and other technological and ecological systems are via the flows of matter, information, and energy across the boundaries of the system. Figure 5.2 illustrates how these flows may vary across the life cycle of a built facility.

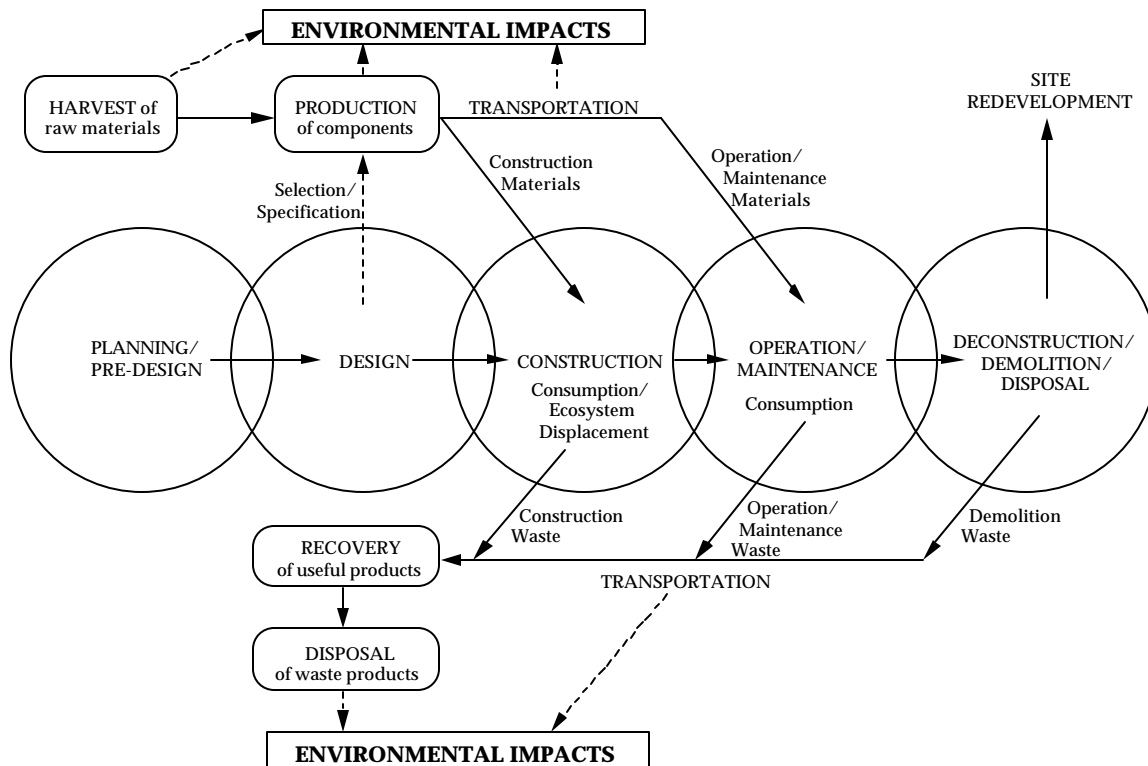


Figure 2: Interfaces of Built Facilities with External Systems
(Pearce 1999; adapted from Yeang 1995, Roberts 1994)

From a systems standpoint, context is defined as everything that exists outside the boundary of the system itself, and can include the community (or installation) in which the facility is located, its humans, buildings, and the ecosystems and resource bases that supply the system itself. Technically, the context of the system includes the whole world outside the system bounds, but since the influence of the system decreases greatly beyond its immediate context, entities far outside the system are typically considered outside the scope of analysis. By defining built facility systems as such, the impacts of built facilities can be separated into two mutually exclusive and collectively exhaustive categories:

- Intra-system impacts – impacts caused by the facility that are felt *within* the boundary of the system itself
- Extra-system impacts – impacts resulting from the flows of matter and energy into and out of the facility system, i.e., across the boundary of the system, that occur *outside* the boundary of the system

Figure 3 illustrates these impacts on a relative scale over the life cycle of a facility system.

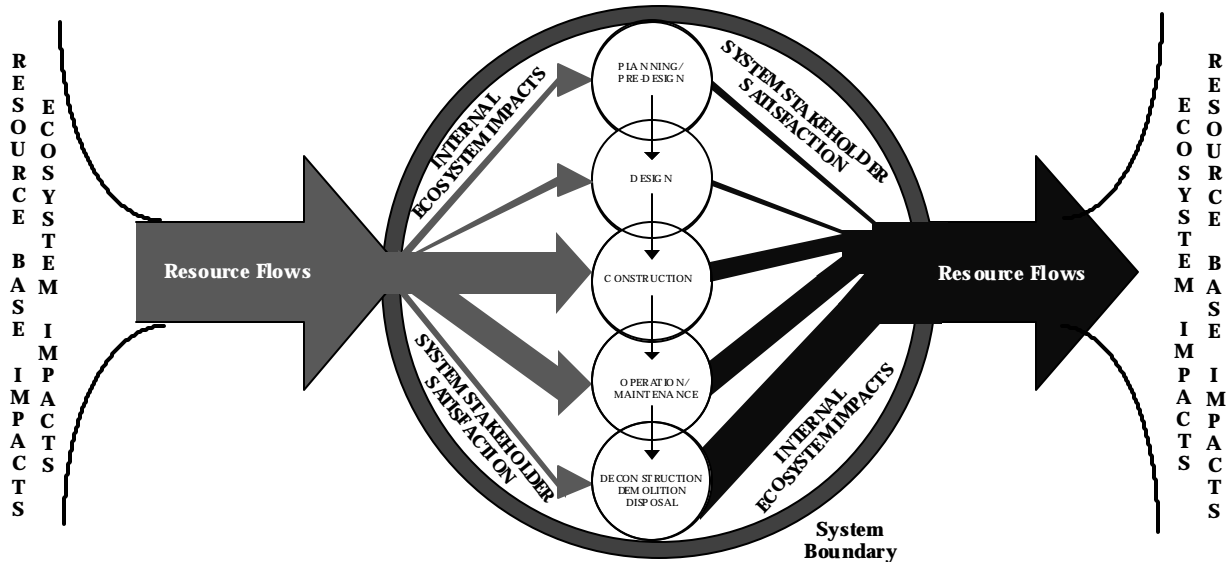


Figure 3: Resource Flows and their Impacts over the Life Cycle of a Typical Throughput Facility (Pearce 1999)

The next sections present derivations of the three primary parameters of sustainability for technological systems, of which built facility systems are one type. Using the concepts of intra-system and extra-system impacts, each of these parameters can be defined in terms of impacts that can be tracked or predicted within the boundary of the system itself, flows of matter, energy, or other resources across the system boundary, and the nature of the sources and/or sinks for those flows, i.e., the impacts that occur within those source and/or sink systems as a result of generating or absorbing resource flows.

Resource Base Impacts

The first parameter of sustainability, Resource Base Impacts, is based on minimizing negative impacts to resource bases. Values for the Resource Base Impacts variable can be represented along a continuum (Figure 4), where the threshold of sustainability is zero net resource base impact caused by the system. This state can occur either when the negative impacts of the system on resource bases equal the positive impacts, or when there are no resources being used by the system.

Resource Base Impact:

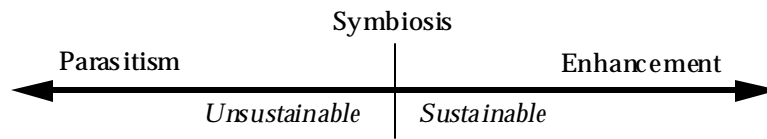


Figure 4: Continuum of Values for the Resource Base Impact Parameter (Pearce 1999)

The entropy gain as a result of the resource flows through the system is also of interest. In the case of a built facility system which consumes matter and energy, the inevitable gain in entropy resulting from that consumption can be offset by influxes of matter or energy from outside the global system, i.e., the solar energy budget.

Values to the right of the sustainability threshold represent a state of sustainability beyond the minimum requirements, where the system acts as a host for other systems in its environment. This region of the continuum represents a net terrestrial resource flow into the system which is less than zero, i.e., a net positive *outflow* of resources (without depleting resources within the system) which can serve as input to support other systems. Values to the left of the sustainability threshold represent a state of parasitism for the system, and include all conditions where the system takes more from its environment than it gives back.

Intra-System Impacts of Facility Systems on Resource Bases: According to the built environment system model (Figure 1), the only way a facility system can impact its context is via the two-way flows of matter, energy, or information across the boundary of the system. As illustrated in Figure 3, these flows vary across the life cycle of the facility, with flows of matter into a typical throughput facility system being greatest in the construction and operation phases of the building life cycle, and flows of matter out being most significant at the end of the life cycle or during operation if the facility generates products (Yeang 1995).

From the perspective of the context of the facility system, each unit of flow across the boundary exerts either a positive, negative, or neutral impact on the source or sink of the flow in the system's context. This impact exerted by the flow on the source or sink system has a certain degree of significance based on the nature of the flow and the properties of the source or sink system.

Three key facility and context system variables are part of the mapping of extra-system impacts to the resource base parameter of sustainability:

- Amount of cross-boundary flow of matter or energy
- Unit impact exerted by flow on source/sink system
- Significance of unit impacts to the source/sink system

As explained earlier, resource base impacts can achieve a zero value if the amount of cross-boundary flows of matter or energy are zero or if the net impact (sum of all impacts) of resource flows is zero, i.e., negative impacts are completely offset by positive impacts.

Intra-System Impacts of Facility Systems on Resource Bases: The remaining impacts caused by a facility system are felt *within* the bounds of the system itself. These impacts are reflected in changes in the quantity and quality of the resource bases on site. From a perspective outside the system, facility systems can add to, maintain as constant, or deplete their initial on-site quantities (and qualities) of resources bases (Yeang 1995). In terms of the quality of on-site resource bases, facility systems can have intra-system impacts when resources within the boundary of the system are consumed by other entities within the system.

For source facilities, the main driver of negative intra-system impacts is the consumption or excessive export of on-site resource bases. For example, a source system such as a tree farm may impact its intra-system resource base by actively cutting trees and exporting them from the site at a rate faster than they can be restored (Goodland 1992). This loss is reflected in the status of the on-site resource base by the fact that there are fewer remaining trees after logging has taken place. It has implications not only for future availability of trees on the site, but also for the capacity of the site's ecosystems to perform load-bearing services to other systems, such as absorbing rainfall (ibid.). Instead, a more likely possibility is that the rain will run off the site to local streams, carrying with it precious topsoil, clogging the stream courses, and creating a situation of even further degradation.

Likewise, resource base impacts are often severe for sink systems. For example, performing a mass/energy balance on a landfill facility system shows that significant quantities of matter accumulate within the facility system over time (Tchobanoglous et al. 1993). Since the typical landfill does not have any mechanism for reducing the entropy of the waste deposited within it, continued influxes of high-entropy waste accumulate within the system and eventually overwhelm the capacity of the system to absorb more input (ibid.).

Intra-system impacts are felt within the facility system as increases or decreases in the capacities of baseline resource bases to generate or absorb flows of matter and energy. By definition, they are most significant for source and sink facility systems, and less significant for typical throughput systems. In evaluating the impacts of a facility system to on-site resource bases, the objective is to calculate the differences between some baseline and the current or predicted post-action state. Intra-system impacts are a function of two principal variables:

- Change in resource bases within the system
- Significance of that change, in the context of the remaining quantity and quality of resources within the system

Most buildings found on military installations (e.g., office buildings, housing, storage depots, etc.) can be classified as throughput facilities, i.e., no significant quantities of resources are depleted or accumulated on site during the facility life cycle. In other cases such as training ranges, these systems can serve as sinks for the accumulation of munitions and ordinance, which if not periodically remediated can seriously degrade both ecosystems and resource bases on site.

Ecosystem Impacts

The second parameter for facility sustainability is the Ecosystem Impacts parameter. Values for the Ecosystem Impacts variable can be represented along a continuum (Figure 5), where the threshold of sustainability is neutral or no impact on ecosystems as a result of the operation of the facility system.

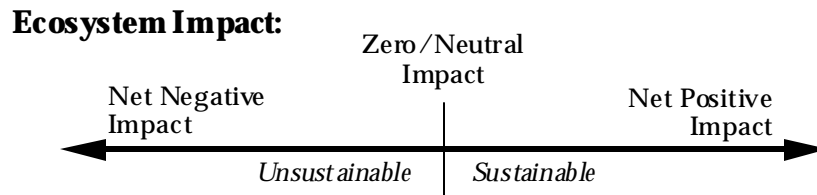


Figure 5: Continuum of Values for the Ecosystem Impacts Parameter (Pearce 1999)

Values to the right of the sustainability threshold represent a state of sustainability beyond the minimum requirements, and include situations where the system results in net positive impacts to ecosystems inside and outside the system such as restoration of damaged ecosystems. Values to the left of the sustainability threshold represent a state of unsustainability for the technological system, and include situations where the net ecological impact of the technology is negative. As with Resource Base Impacts, a state of zero impact can occur either when the negative impacts of the system on ecosystems equal the positive impacts, or when the system has no impact at all on natural ecosystems.

Intra-System Impacts of Facility Systems on Ecosystems: As with resource base impacts, the only way a facility system can impact its context is via the two-way flows of matter, energy, or information across the boundary of the system. From the perspective of the context of the facility system, each unit of flow across the boundary exerts either a positive, negative, or neutral impact on the source or sink of the flow in the system's context. This impact exerted by the flow on the source or sink system has a certain degree of significance based on the nature of the flow and the properties of the source or sink system. Three key facility and context system variables are part of the mapping of extra-system impacts to the ecosystem parameter of sustainability:

- Amount of cross-boundary flow of matter or energy
- Unit impact exerted by flow on source/sink system
- Significance of unit impacts to the source/sink system

As explained earlier, ecosystem impacts can achieve a zero value if the amount of cross-boundary flows of matter of energy are zero or if the net impact (sum of all impacts) of resource flows is zero, i.e., negative impacts are completely offset by positive impacts.

Intra-System Impacts of Facility Systems on Ecosystems: Similar to resource base impacts, the remaining impacts caused by a facility system are felt *within* the bounds of the system itself. These impacts are reflected in changes in the quantity and quality of the

ecosystems on site. From a perspective outside the system, facility systems can add to, maintain as constant, or deplete their initial on-site quantities (and qualities) of ecosystems via displacement (or replacement), destruction (or construction), degradation (or restoration), or other means (Yeang 1995).

In the case of throughput facilities, the main causes of negative intra-system impact are the destruction or displacement of on-site ecosystems by the system stakeholders and their structures. For example, an owner may decide to install a paved parking lot in an area currently occupied by an ecosystem, destroying vegetation and displacing fauna during construction, and causing negative impacts to groundwater from stormwater runoff after the lot is installed. This action will have negative intra-system ecosystem impacts. To offset these impacts, the owner could attempt to restore an ecosystem on another part of the site, or try to mitigate the negative impacts of the paved area by using porous paving material to reduce runoff.

Intra-system impacts are felt within the facility system as increases or decreases in the capacities of baseline ecosystems to generate or absorb flows of matter and energy. By definition, they are most significant for source and sink facility systems, and less significant for typical throughput systems. In evaluating the impacts of a facility system to on-site ecosystems, the objective is to calculate the differences between some baseline and the current or predicted post-action state. Intra-system impacts are a function of two principal variables:

- Change in ecosystems within the system
- Significance of that change, in the context of the remaining integrity of ecosystems within the system

As described in the section on resource base impacts, some functional areas of military installations serve as sources or sinks for potentially damaging flows of matter and energy such as exploding or unexploded ordinance (e.g., training ranges). Most buildings on an installation, as throughput facilities, typically experience most of their intra-system damage to ecosystems during construction, while impacts during operations are shifted to the systems that provide matter and energy or absorb waste from the system itself.

Stakeholder Impacts

The third parameter of sustainability relevant to built environment systems, Stakeholder Satisfaction Impacts, is based on the anthropocentric objectives of sustainability described earlier, and ties into the question of who is being sustained at a facility systems level – System Stakeholders. Values for the Stakeholder Satisfaction parameter can be represented along a continuum (Figure 6), where the threshold of sustainability is biological survival of the system stakeholders, i.e., a state in which the basic human needs of system stakeholders are met.

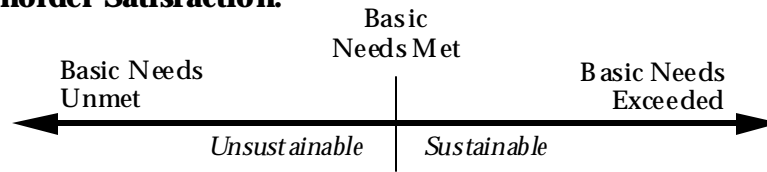
Stakeholder Satisfaction:

Figure 6: Continuum of Values for the Stakeholder Satisfaction Parameter
(Pearce 1999)

Values for the Stakeholder Satisfaction parameter to the right of the sustainability threshold represent a state of sustainability beyond the minimum requirements, and include satisfaction of stakeholder needs and aspirations beyond the requirements for mere biological survival. Values to the left of the sustainability threshold represent a state of unsustainability for the technological system, and include those conditions under which the stakeholder needs are not being met. As discussed in the introduction to this document, ensuring that stakeholder needs and aspirations are satisfied is important not only from a design standpoint, but also since building stakeholders typically have a wide range of options available to them and are likely to choose an alternative to a sustainable solution if that solution does not meet their needs.

The sustainability of facility systems scopes consideration of human satisfaction to direct, or intra-system, stakeholders. The reason for this scope decision is that if a facility system meets the requirements for sustainability in terms of resource base and ecosystem impacts, it will not negatively impact the ability of humans outside the system to meet their own needs. Thus, the concerns of extra-system humans are addressed by the other two parameters of sustainability and do not need to be considered again in the Stakeholder Satisfaction parameter (Pearce 1999, DuBose & Pearce 1997). The set of intra-system stakeholders includes residents/tenants, maintenance staff, owners, developers, and others within its boundary who are directly impacted by the facility system.

Determining what influences the satisfaction of direct stakeholders with respect to the facility is necessary. First and foremost is to establish what is meant by the term satisfaction. One can not only measure levels of stakeholder satisfaction based on expectations for built environment performance, but also the relative importance of these expectations across the spectrum of possible needs that built facility systems could meet (Maslow 1943, Alderfer 1972, Allen 1980). The hybrid combination of these perspectives provides a foundation for measuring stakeholder satisfaction as afforded by built environment systems. Accordingly, the following variables determine the Stakeholder Satisfaction parameter of sustainability:

- Degree to which stakeholder expectations of the facility are being met.
- Relative importance of expectations to the stakeholder.

By understanding what expectations stakeholders have of their built facility, these variables can be used to evaluate the degree to which scenarios using different

technology and strategy configurations achieve sustainability with respect to the Stakeholder Satisfaction parameter.

A Composite Representation of Sustainability for Facility Systems

Figure 7 shows a triaxial representation of the parameters of facility sustainability, where the intersection of the three axes represents the thresholds of sustainability for each parameter. The positive region for each axis represents the spectrum of possibilities for the desirable states of facility systems in terms of sustainability. The following three thresholds define a state of sustainability for facility systems:

- Resource Base Impact No or neutral impacts
- Ecosystem Impact No or neutral impacts
- Stakeholder Satisfaction Basic needs met

The variables identified for each parameter in the previous sections can be summarized as shown in Table 1 in terms of each parameter. These key variables that define facility sustainability can be classified in terms of how the existence and operation of the facility system creates impacts both within itself and outside its boundary in its context.

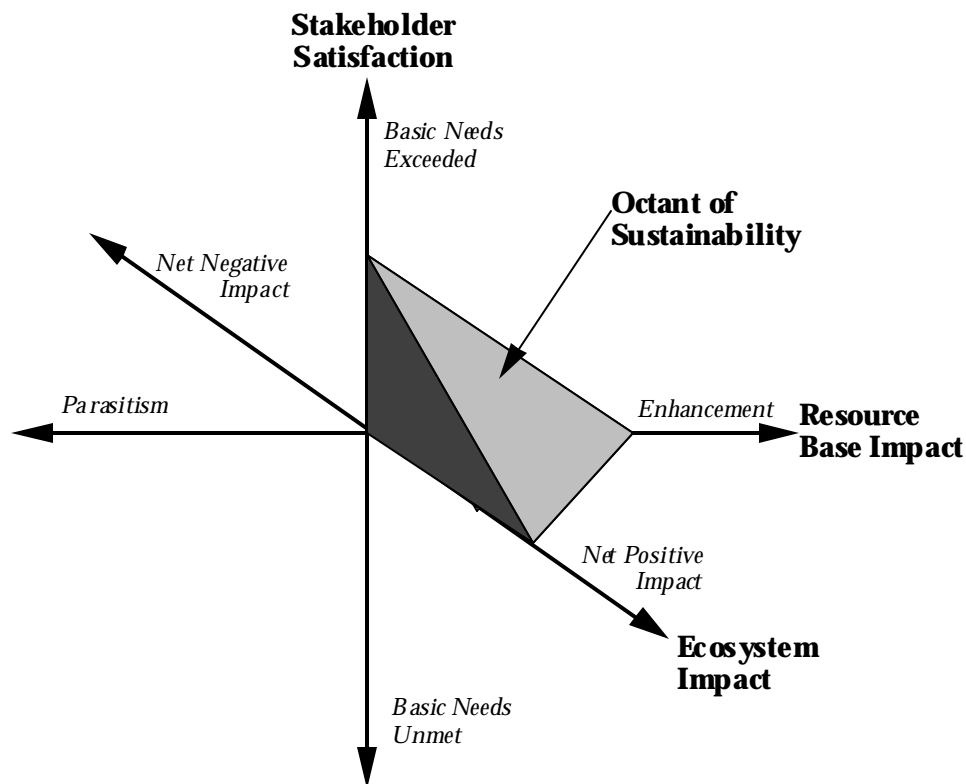


Figure 7: Triaxial Representation of Facility Sustainability

Table 1: Classification of Key Variables Defining Facility Sustainability

	Intra-System Impacts	Extra-System Impacts
Stakeholder Satisfaction	<ul style="list-style-type: none"> • Stakeholder expectations met • Relative importance of stakeholder expectations 	Covered by attending to Extra-System Resource Base and Ecosystem Impacts
Resource Base Impacts	<ul style="list-style-type: none"> • Change in intra-system resource bases • Significance of change 	<ul style="list-style-type: none"> • Resource flow into/out of facility system • Unit impact exerted by flow on source/sink system • Significance of unit impact
Ecosystem Impacts	<ul style="list-style-type: none"> • Change in intra-system ecosystems • Significance of change 	<ul style="list-style-type: none"> • Resource flows into/out of facility system • Unit impact exerted by flow on source/sink system • Significance of unit impact

Facility-Based Drivers of Sustainability Parameters: The Principle of Locus of Control

Having derived the three parameters of sustainability for built facility systems and identified the variables that determine values for each parameter, the purpose of this subsection is to define a priority for improving sustainability of facility systems based on how easy it is to influence each of the variables that control sustainability parameters. In general, it is easiest to control variables within the facility system itself, and more difficult to control the impacts associated with other systems. These other systems are affiliated with the facility system in question by virtue of serving as sources or sinks for cross-boundary resource flows of matter and energy, and are hereafter denoted affiliate systems (AS). Figure 8 illustrates the principle of locus of control, which shows a generalized curve describing the degree of control able to be exerted by facility decision makers on the impacts of the system in question and its affiliate system.

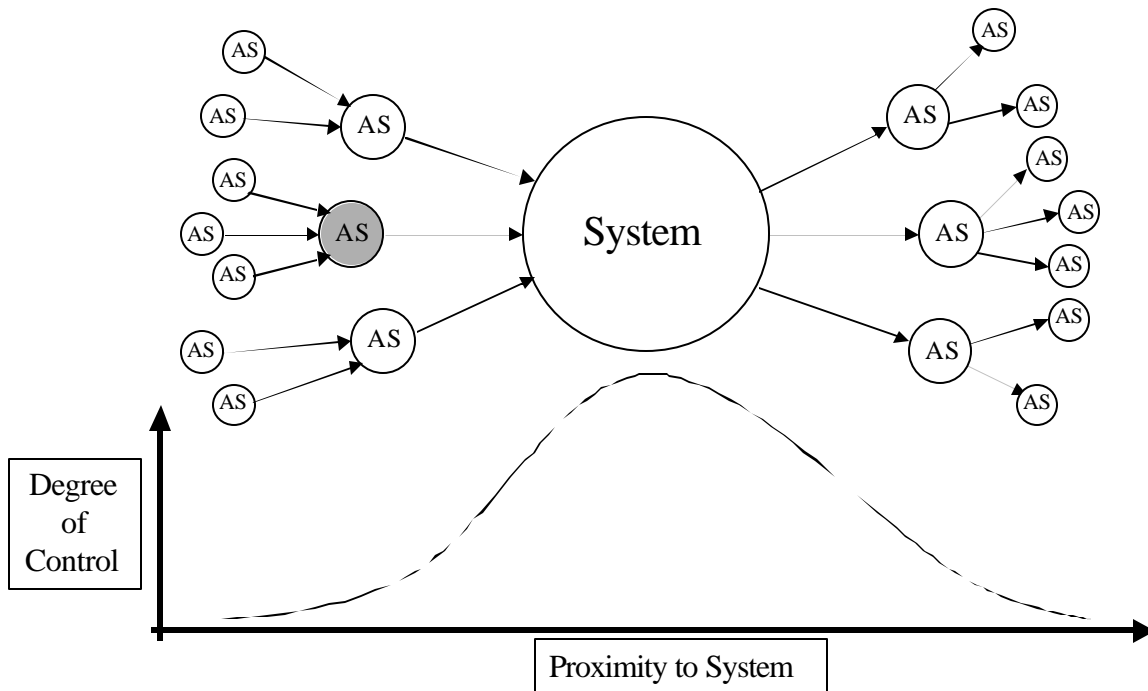


Figure 8: The Principle of Locus of Control

In Figure 8, affiliate systems are denoted by “AS” inside circles. Each affiliate system is associated with a flow coming into or going out of the facility system itself. For example, the affiliate system circles to the right of the central system circle denote systems that supply some form of matter or energy to the system, so indicated by an arrow pointing into the central system circle. Each of these affiliate systems is itself supplied by its own network of affiliate systems, which is supplied by other networks of affiliate systems all the way back to initial virgin sources of matter or energy. The same principles apply on the downstream side of the facility system, illustrated by flow arrows connecting affiliate systems to the right of the central system circle.

The graph below the diagram in Figure 8 shows a generalized function (approximated to be continuous) describing the degree of control a decision maker in the central system circle can exert on the impacts caused by his or her decisions. As shown in this graph, the decision maker has maximum control over impacts within the boundaries of his or her own system. For example, the decision maker can decide not to disturb an area of virgin ecosystem on a military installation, thereby avoiding any negative impact to that ecosystem by virtue of the decision itself. Outside the bounds of the system, the decision maker can control impacts in one of several ways (described in more detail in the next section):

- Reducing or increasing the quantity of resource flows
- Finding alternative sources or sinks for resource flows that have different unit impacts
- Creating changes to other systems that offset unavoidable impacts of the system in question

The most reliable and powerful way to influence the impacts of cross-boundary flows is to internally control the quantity of matter and/or energy required or generated by the system itself. For example, a facility system could reduce its impacts on the natural ecosystems within a watershed by installing water-conserving fixtures and appliances, thus reducing the amount of water harvested from the watershed and reducing disturbance to natural ecosystems and resource bases within that watershed. As long as the new fixtures and appliances meet stakeholder expectations for performance, installation of these fixtures increases the sustainability of the facility system.

The second way to control extra-system impacts is to find an alternative source or sink for matter and energy flows stimulated by the system. In many cases, more environmentally friendly sources can be identified and utilized, such as using timber from sustainably harvested forests or buying power from renewable energy sources. In some cases, the affiliate systems of affiliate systems can be influenced, such as requiring a manufacturer to use post-consumer recycled materials in manufacturing their product. In other cases, the source or sink associated with a given flow of matter or energy is more difficult or impossible to change, e.g., finding an alternative to municipal water supply or a different place to exhaust waste heat than the immediately surrounding atmosphere. Since the options of sources and/or sinks are often limited or difficult to change, this strategy has an overall lower degree of control than changes exerted within the system itself. Influencing affiliate systems of affiliate systems becomes increasingly difficult as the systems become increasingly remote from the original system; hence, the exponential decay of control as shown in the graph in Figure 8.

The third way to influence net impacts to ecosystems and resource bases is to artificially cause change in other systems that offsets unavoidable impacts in the system in question. For example, a facility could be designed to include a local renewable energy system such as photovoltaic panels that would completely provide all the power needs of the building during operation—a net impact of zero attributable to power flows. However, the manufacture and installation of the system itself consumes energy that has associated impacts, resulting in a net negative impact due to power over the whole life cycle of the facility. One way to offset this initial negative impact is to work with neighboring buildings to reduce their consumption of energy, enough to save the amount of energy required for manufacturing and installing the panels. This strategy can be used with varying degrees of effectiveness depending on the quantity of impacts needing to be offset, the availability of other systems whose impacts can be improved, and the time frame required for impact offset. The next section describes these sets of strategies as part of the spectrum of opportunities for sustainability improvement in built facility systems.

The Spectrum of Strategies for Sustainability Improvement

By combining the intra-system strategies for influencing sustainability parameters with the extra-system strategies discussed in the previous section, a total of five methods for achieving zero impacts can be identified and expanded into additional strategies as shown in Figure 9. These methods center around minimizing cross-boundary flows to sources or sinks with negative impacts, choosing sources and/or sinks with more positive impacts, and when all else fails, seeking options to offset the system's impact by improving the impacts of other systems.

The first strategy for reducing a system's impact to zero is to reduce the quantity of cross-boundary flows to zero. Reducing cross-boundary flows to zero also reduces extra-system impacts to zero, since cross-boundary flows are the only way a system interacts with its context. This option assumes that the intra-system impacts of the system are neutral or positive; if they are not, the strategy must be combined with other strategies to reduce total impact to zero. There are three sub-strategies for eliminating cross-boundary flows. First, flows can be eliminated by eliminating the need that caused that flow in the first place. For example, incorporating passive solar heating into a facility design may mean that no energy is required to power equipment to heat the building, thereby eliminating that flow of energy altogether. The second way to eliminate cross-boundary flows is to meet the need on site using methods with no negative impacts. An example of this second method is to eliminate import of potable water into the system by using rainwater harvesting and treatment, thereby eliminating secondary impacts caused by the system that supplies potable water to the site. The third way to eliminate cross-boundary flows is to change the way the need itself is met – for example, the use of incinerating toilets meets the need for disposal of human waste without using water. While this technology uses *other* kinds of resources, they may originate from more sustainable sources than the resources required for a traditional human waste disposal system.

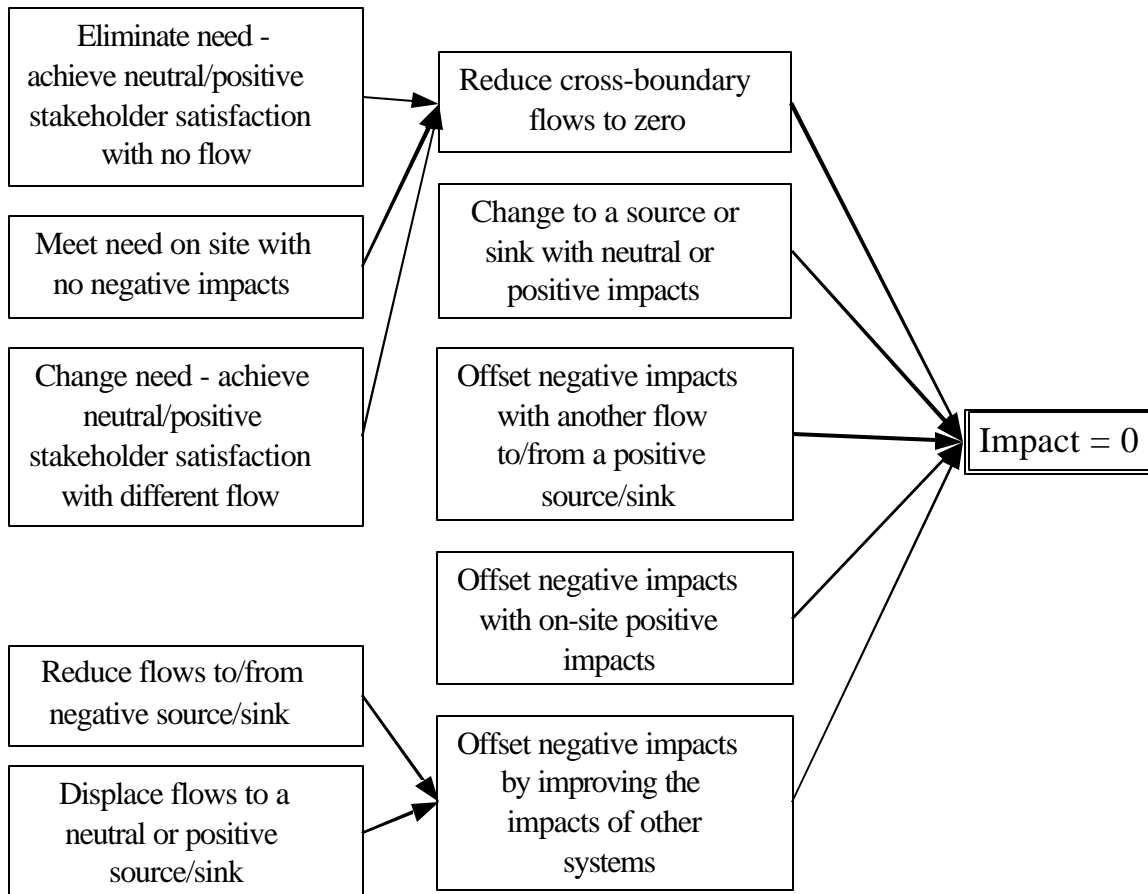


Figure 9: The Spectrum of Strategies for Improving Facility Sustainability

The second major strategy for reducing facility system impacts to zero is to change the source or sink of a given cross-boundary flow. As discussed in previous sections, the impact of a cross-boundary flow is dependent not only on the attributes of the flow itself but also on the attributes of the source or sink for that flow. If a source or sink can be found that improves the quality of a resource base or ecosystem, then all flows to that source will have a net positive impact. An example of this strategy is to send wastewater from a facility to a constructed wetland or living machine – both are ecosystem-based methods for purifying wastewater that take advantage of nutrients in the water and convert them into plant matter. This plant matter then also provides other environmental benefits such as carbon fixing, air cleaning, and soil stabilization.

The third strategy, a variation on the previous strategy, involves offsetting negative impacts due to one flow by generating another flow that has net positive impacts. This strategy applies to situations where no positive source or sink is available and the flow itself cannot be reduced to zero. An example of this strategy is to divert a portion of the system's wastewater stream to the kind of sink described above, i.e., an ecosystem-based treatment system. The net positive impacts of this kind of treatment system may be enough to offset negative impacts caused by the sink used for the remaining wastewater. The balance among impacts is determined by the attributes of the source/sink system and the quantity and attributes of the flow. The flows of other kinds of resources can also be used to offset the negative impacts of the original flow.

The fourth strategy is to offset unavoidable negative impacts by actively generating positive impacts *within* the system itself, i.e., on-site or intra-system impacts. An example of this strategy is to restore an ecosystem on site, e.g., a wetland, to its most productive state to offset impacts incurred off-site due to cross-boundary flows.

The final strategy involves improving the impacts of other systems to offset unavoidable impacts in one's own system. An example of this strategy is to install energy-efficient lighting in other buildings on an installation to offset the energy embodied in a photovoltaic system providing power for the original building. Even though the photovoltaic system may provide enough zero-impact power to meet the building's ongoing energy needs, it still required energy for its manufacture, transportation, and installation on site, and this energy can be offset in other facilities by assisting them in saving energy. This is an example of reducing flows from a negative source (for example, a coal-fired power plant) in the other system. The strategy can also be achieved by helping other systems displace their resource flows to better sources or sinks (for example, installing renewable energy generation capacity in other facilities to offset their dependence on nonrenewable sources).

All of these strategies represent opportunities to reduce the net impact of a facility on ecosystems and resource bases to zero, i.e., the threshold of sustainability. In this study, each of these avenues is explored as a means of increasing the sustainability of Building 170.

Sustainability During the Project Life Cycle

A built facility is a significant undertaking for all involved stakeholders. The life cycle of built facilities typically ranges from 30 to over 100 years (Yeang 1993), depending on the

nature of the facility and the uses to which it is put. Over the life cycle of the facility, sustainability can enter into the project realization process in a variety of ways. The following subsections set the stage for understanding how sustainability can be implemented in facilities over their life cycle. This section begins by introducing the project delivery process and post-delivery phases of a facility's life cycle, then examines sustainability opportunities, issues, and constraints relevant to each phase of the process. The roles of building stakeholders in achieving sustainability are described, and the section concludes with a discussion of the role of design and other early life cycle phases in effectively achieving sustainability for a built facility project.

The Project Delivery Process and Post-Delivery Project Life Cycle

Figure 10 presents a model of the major phases of the facility life cycle. The properties of each of these phases are described in the following paragraphs.

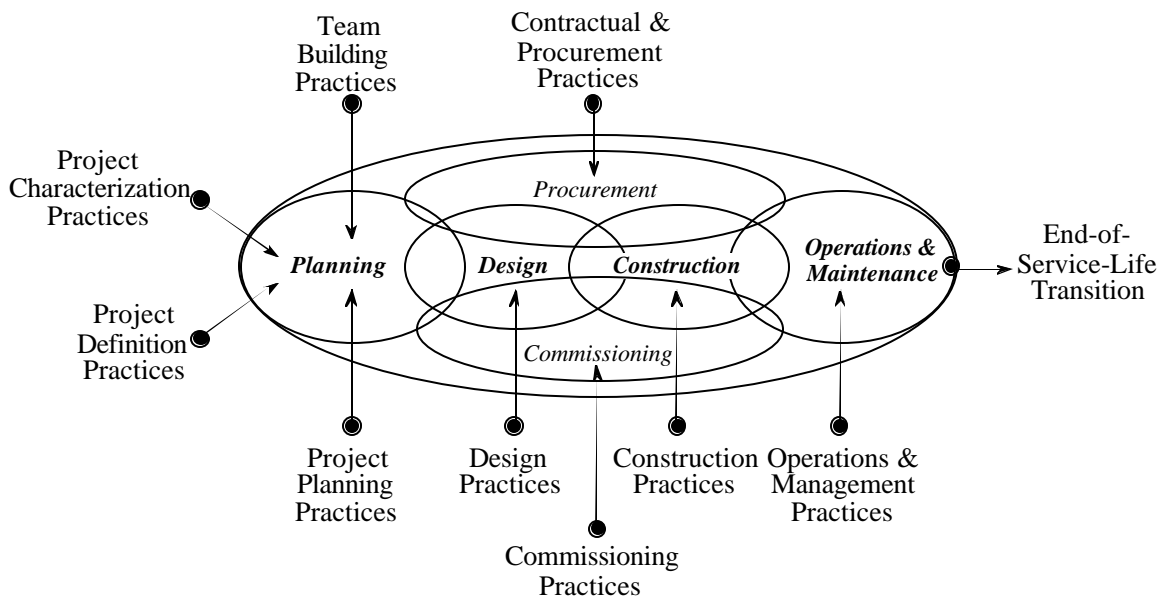


Figure 10: Phases of a Facility's Life Cycle (Vanegas 2000)

Project Characterization – Project characterization is a preliminary activity that occurs after the need for a facility has been identified. Characterization involves identifying what kind of facility will meet the identified need, and initiating the process of further defining the project itself.

Project Definition – Project definition also feeds into the project life cycle and includes definition of the objectives, scope, and influencing features of the project's context to set the stage for planning the project at the start of the life cycle.

Team Building – Also feeding into the beginning phases of the life cycle is the activity of team building, in which players that will participate in the planning, design, construction, and other phases of the project are brought together to perform the work. Key to this activity is clear definition of the objectives and scope of the project, so that entities with appropriate capabilities can be invited to participate.

Project Planning – The primary role of the project planning process is to determine the viability of a capital project and develop a program of requirements for a facility that will meet the needs of all stakeholders. Planning focuses primarily on articulating the requirements of building owners, users, operators, and other post-delivery stakeholders in a way that can be understood by the design team as they create a design for the facility. Specific tasks in this phase include (Vanegas et al. 1998): assessment of project type and needs; definition of objectives, scope, and context; business, economic, and engineering studies; and definition of budget and economic thresholds. Sustainability can also be included at the planning stage as a specifically defined objective for the project.

Design – The design phase of the project involves conversion of the program of requirements for the facility into a set of documents that can be used to actually build it. Design is typically carried out by architects and/or engineers, and is broken down into development of conceptual design solution, development of schematic design solution, development of detailed design solution, and preparation of contract documents. The process is typically cyclical within each step as alternatives are identified and analyzed in order to select a solution that will best meet the needs outlined in the program of requirements.

Contracting & Procurement – Contracting and procurement spans all four of the primary phases of the life cycle: planning, design, construction, and operations/maintenance. As external entities are required to complete project tasks associated with these phases, contracting is the mechanism employed for making these entities a part of the project team. Likewise, procurement is the mechanism for bringing needed materials and equipment resources on line as the project progresses.

Commissioning – Like contracting and procurement, commissioning is most effective when implemented over the whole project life cycle, including planning, design, construction, and operations/maintenance. Commissioning involves ensuring that the constructed facility will be fully operational at the conclusion of the construction phase by ensuring that all systems have been tested, tuned, and inspected before the official start-up of operations. Earlier in the project life cycle, commissioning helps project planners and designers understand the constructability and operability requirements of the systems and equipment they design. Formal commissioning is most frequently associated with the end of the construction process, although commissioning agents can prove to be extremely helpful in avoiding future problems if employed during the construction phase as well. After the building is in operation, periodic recommissioning can help to assure that the facility continues to perform at its designed level of performance.

Construction – Construction is the phase of the life cycle in which the building goes from an idea on paper to a physical reality. This phase of the project life cycle includes construction planning, execution, and start-up, which marks the transition into the operations and maintenance phase of the life cycle.

Operations & Maintenance – Operations and maintenance is the longest phase of the facility life cycle and consists of the period during which the facility is occupied or otherwise in service to meet the needs of its stakeholders. Maintenance involves taking care of the facility and making minor changes or repairs that are necessary to keep the building functioning. More major changes to the facility are typically considered to be

rehabilitation or retrofits, and involve significant modifications to the facility to change or upgrade its functional capabilities. For these kinds of changes, a loop back through the earlier phases of the life cycle (i.e., planning, design, and construction) and its associated activities is typically undertaken, resulting in the start-up of a revised facility with different functional capabilities.

End-of-Service-Life Transition – The final state of the facility involves its end-of-service-life transition. When the facility is no longer able to meet the needs of its stakeholders, it is typically decommissioned, demolished, or deconstructed to remove it from the owner's inventory and make way for other development.

Sustainability Constraints During the Project Life Cycle

Project stakeholders who take a sustainability approach to construction will be rewarded with reduced liability, new markets, and an Earth-friendlier construction process, which will help future and current generations to achieve a better quality of life (Kinlaw 1992, Liddle 1994). Figure 11 shows a unified framework for implementing change for sustainability in the A/E/C industry, in terms of the realization process for built facilities with which all stakeholders are involved. The first element of the framework is an overall vision for all stakeholders within a specific organization or affiliated with a specific project that defines the principles of sustainability to govern all decisions and actions. Five main considerations serve as a starting point for defining a global sustainability policy: 1) internal and external contextual compatibility; 2) environmental benign-ness; 3) long-term sustainability; 4) enhanced life cycle product and process performance; and 5) planned end-of-service-life transition. Integration of perspectives within and across organizations in terms of a global policy is key to achieving project sustainability.

Within the global policy for sustainability, eight components provide the foundations for structuring practice- or project-specific strategic objectives and measurable goals in terms of sustainability principles. The first two components define the entire project and set the stage for all project decisions.

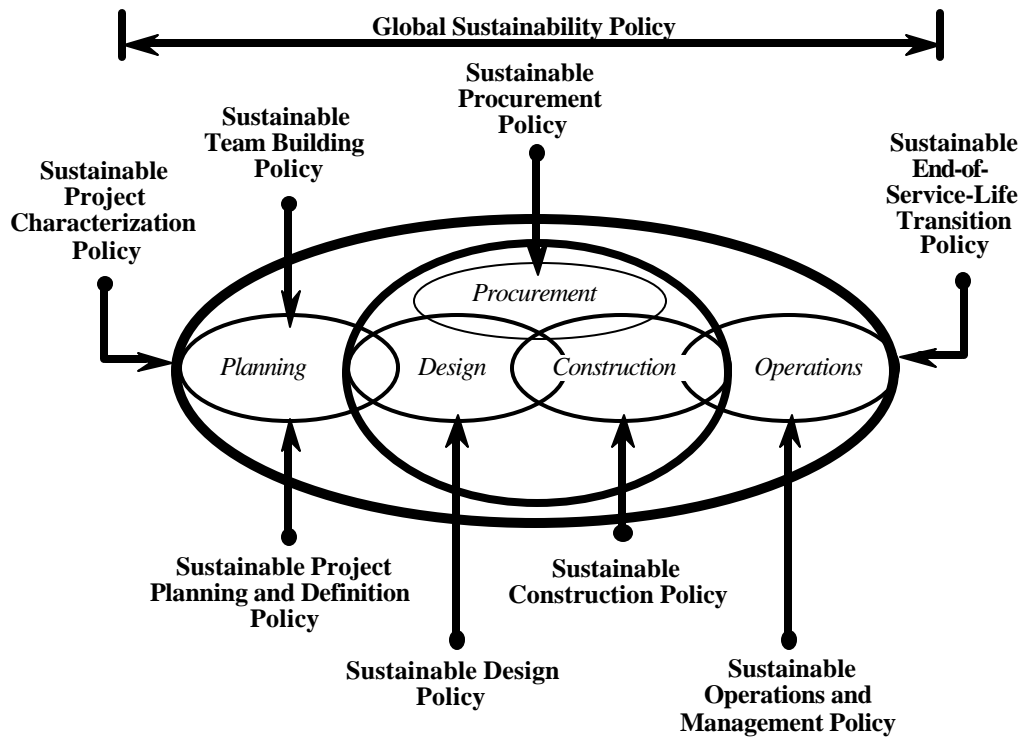


Figure 11: Unified Framework for Sustainability in the A/E/C Industry
(Vanegas & Pearce 2000)

Component 1: Sustainable Project Characterization – The first component lays the foundation for the degree, breadth, and depth of sustainability efforts throughout the whole process. This process involves systematic specification of the attributes, characteristics, and qualities of a given project from a sustainability perspective in terms of a) industry sector represented (real estate development, residential, civil infrastructure, industrial, and building construction), and b) type of project (e.g., new construction, rehabilitation, retrofit, etc.). The outcome of project characterization enables a project to be defined with a level of sustainability appropriate to its context.

Component 2: Sustainable Team Building – The second component ensures that all key project stakeholders have a common ground for understanding sustainability principles and concepts, as well as the training to operate as high-performance teams. Specific elements that should be considered include sustainable problem solving, partnering, team dynamics, and team maintenance (Vanegas et al. 1998).

These first two components are a starting point for establishing strategic objectives, measurable goals, and execution plans for project sustainability, and must include all project stakeholders to be effective. The next four components define considerations that guide the complete *delivery* of the project in terms of sustainability criteria established in the global sustainability policy.

Component 3: Sustainable Project Planning and Definition - The Planning Phase includes an initial needs assessment and setting of preliminary objectives; preliminary planning and funding approval; analysis and definition of project scope, and in some cases, it includes the development of the conceptual/schematic design, which marks the transition into design. This phase has the greatest potential to influence overall project sustainability at lowest cost. Specific elements that should be considered include sustainable site selection, framing of project needs, and compatibility of project scope with contextual requirements (Vanegas 1997; Pearce 1999).

Component 4: Sustainable Design - The Design Phase continues with detailed design and the development of contract documents, and in some cases, includes bidding or negotiation, and award of the construction contract, which marks the transition into construction. This phase also affords opportunities for influencing project sustainability before any actions begin on site. Specific elements that should be considered include integration of building systems, passive design strategies, material sustainability, and indoor environmental quality (PTI 1996).

Component 5: Sustainable Procurement - The Procurement Phase bridges the gap between design and construction, in which materials, construction resources, and facility components specified by designers are obtained to physically realize the facility. While at this point the nature, levels of performance, and desired attributes of facility components have been fixed by the project design, considerable impact can still result due to the sources of specified materials and how they are brought into the project. Specific elements that should be considered include reduction or elimination of packaging, recycled content, waste minimization, and environmental benignness of manufacturer processes (Vanegas 1997; PTI 1996).

Component 6: Sustainable Construction - The Construction Phase includes construction planning, execution, and start-up and commissioning, which marks the transition into operations. Construction is the bridge between concept and reality, and offers additional opportunities for increasing sustainability of the project. Specific elements that should be considered include site disturbance, indoor environmental quality, construction recycling, and construction health and safety (PTI 1996).

Components 3-6 provide a structured framework of considerations appropriate to different temporal phases of built facilities as they are delivered. Explicitly, formally, and systematically, both from systems and temporal perspectives, considering sustainability principles should be an ongoing part of the activities occurring in each phase, and should be consulted at all times by all involved stakeholders. The final two components also involve active consideration of sustainability principles by involved stakeholders and deal with the use and end-of-service-life of the facility.

Component 7: Sustainable Operations and Maintenance – Following Construction, the Operation Phase includes full operation, maintenance, and management of the facility, until an end-of-service-life decision is made. Sustainable operations and maintenance involves effective planning and allocation of resources over the operational life of the facility. Specific elements that should be considered include indoor air quality, thermal comfort, light quality, energy, water, and resource conservation, and waste management (PTI 1996).

Component 8: Sustainable End-of-Service-Life - The final component of the framework deals with the end of the useful life of the facility. Explicit consideration of this component should be considered by all stakeholders during the project life cycle, since actions during all previous phases can impact actions at this final point of the facility's life. Specific elements that should be considered include disassembly/reuse of components, material recovery/recycling, and site reclamation (Yeang 1995).

To effectively achieve sustainability, each of these components has to be operationalized in terms of (a) specific objectives, (b) measurable goals, and (c) detailed execution plans to address each set of considerations. In operationalizing sustainability in terms of objectives and related measurable goals, each component of the framework provides both (a) a point of reference for changing organizational behavior in terms of existing practices familiar to A/E/C organizations; (b) boundaries for scoping and managing information in terms of its relevance to both the project and sustainability considerations appropriate for the phase in question; and (c) a means of maintaining an overall vision for sustainability which can be reached incrementally and realistically by improving performance project by project. After an overall objective has been established that reflects the organization's overall sustainability policy, each objective can be operationalized into a specific measurable goal that is appropriate contextually in terms of sustainability parameters and realistically in terms of the organization's current practices. For example, in terms of the objective "strive for zero waste," an appropriate but realistic goal for early projects from a construction standpoint might be to establish a recycling program to reduce waste to landfills by 25%. As the organization meets this goal, it can be made incrementally more rigorous until the initial objective is met.

The Roles of Building Stakeholders in Achieving Facility Sustainability

Building stakeholders play a significant role in the sustainability of the facility system. Facilities exist fundamentally to meet the needs of their stakeholders, and the ability of a facility to meet those needs is a fundamental parameter that determines the sustainability of the facility. In other words, a facility that does not meet the needs of its stakeholders is an unsustainable use of resources and displacement of ecosystems; therefore, achieving stakeholder satisfaction is a critical component of facility sustainability.

Figure 12 shows a classification of stakeholder perspectives in alignment with the phases of a facility life cycle. The following paragraphs describe how each of these stakeholder groups affect the sustainability of a facility over its life cycle.

Owners – The owners of a facility are the primary determinant of the nature of the facility that gets built. Owners are the beneficiaries of the existence of the building, and as such are concerned with the economic, liability, and functional capabilities of the facility. As the stakeholder who initiates the project in the first place and who is financially responsible for its construction and operation, the owner has the most significant opportunity to ensure that sustainability objectives are included as part of the project. Owners can provide both directive and economic incentives for including sustainable building technologies and strategies in their facilities, and hold responsibility for guiding the rest of the project team in the proper direction with respect to sustainability.

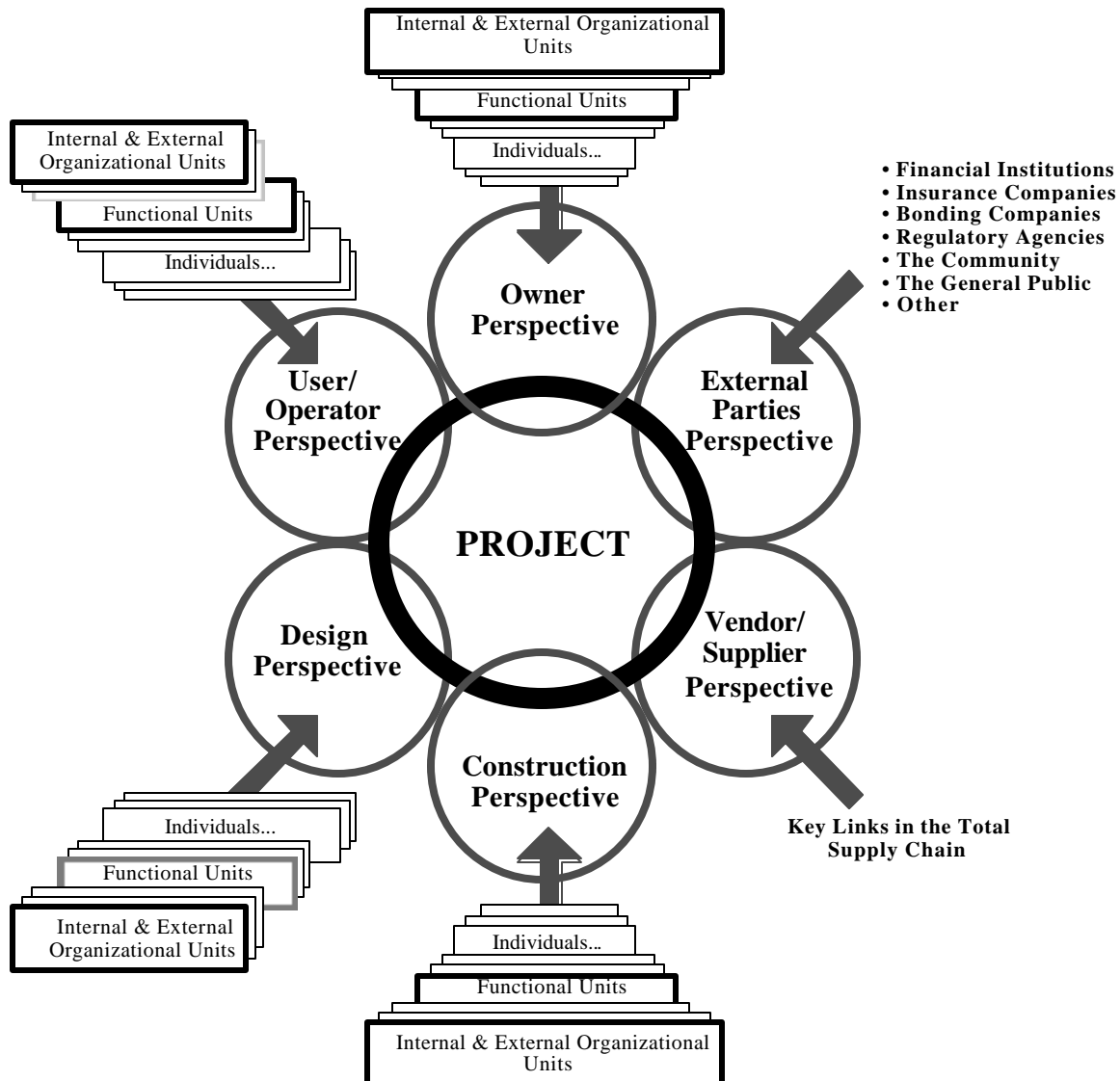


Figure 12: Stakeholders of a Built Facility System (Vanegas 2000)

Users/Operators – Users and operators are a second significant stakeholder in achieving sustainability in built facilities. While in some cases these stakeholders are the same as the owner (e.g., a privately owned residence), in many larger buildings users may be tenants that lease space from the building owner, and operators may be direct employees of the owner or contractors who operate and maintain the building. These stakeholders are involved in the most energy- and resource-intensive phase of the facility life cycle (operations and maintenance), and their interactions with the facility on a day-to-day basis can significantly impact the sustainability of the building as a whole. The degree to which users/operators utilize building systems as they were intended to be used is a primary determinant of sustainability. For example, if building HVAC systems are improperly maintained, they may never perform at peak levels and will always use more energy than they would use if properly maintained. The resulting climate in the building may be unpleasant for the building occupants, possibly leading them to supplement the

building's climate control system with small heating units or fans that add to the plug loads of the building and increase its energy consumption. In many ways, users and operators have the potential to influence the sustainability of the facility, and it is with the interests and abilities of these stakeholders in mind that the facility should be designed to optimize sustainability.

Designers – Designers are stakeholders who develop plans for the facility in such a way that the resulting facility will meet the needs of its owners, users, and operators. Typically architects and/or engineers, designers have a responsibility to inform owners about and incorporate sustainable building technologies in the design of their facilities that will meet the needs of building occupants and operators.

Constructors – Constructors have the role of bringing the facility into existence based on an idea on paper. Constructors play a significant role in ensuring that sustainable technologies and design strategies specified by designers are properly implemented during construction execution. Constructors also have substantial influence on the impacts to the site itself during construction, and can control to a large degree the extent of intra-system impacts during the construction phase of the facility life cycle.

Vendors/Suppliers – Vendors and suppliers provide the materials and equipment that go into the physical realization of the facility. They can influence the sustainability of the overall project by making available products that are environmentally friendly to the constructors of the facility. Other sustainability opportunities for vendors and suppliers include minimizing or recollection of product packaging, delivery of products to the site in a way that minimizes site disturbance and material damage, and provision of product information to support the selection and specification of sustainable building products and technologies.

External Parties – The final class of stakeholders, external parties, includes all organizations and individuals that have an interest in or influence over the project, but who are not directly involved in the realization of the project itself. This class of stakeholders, including financiers, regulators, the local community, and others, has the potential to influence the sustainability of the building by providing incentives to encourage the use of sustainable technologies and strategies by direct building stakeholders. Examples of these kinds of incentives include energy-efficient mortgages, grants, legislation/regulations, and political pressure and publicity.

Design as a Key to a Sustainable Facility Life Cycle

Having explored the overall notion of the facility life cycle and the stakeholders involved in the facility, it is important to emphasize that actions taken at different phases of the life cycle can have varying degrees of influence on the overall sustainability and performance of the project. Figure 13 shows the relative ease of influencing the qualities of the facility over time versus the cost of influence. During the early phases of the project life cycle, while the facility exists only on paper, it is far easier to make changes to improve the sustainability of the facility than after it has been built. Improvements to the facility can certainly still be made at later phases of the life cycle, some more easily than others, but these changes typically cost more to implement later than they would have if implemented while the facility was still on paper.

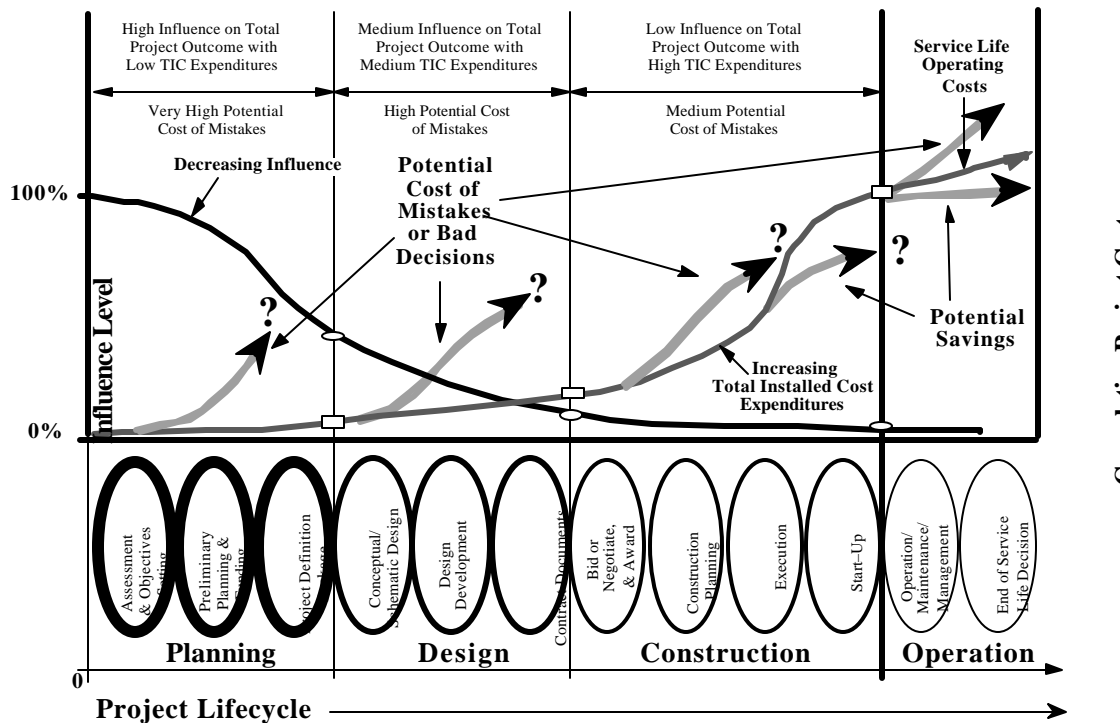


Figure 13: Influence over Project Characteristics vs. Time (Vanegas et al. 1998)

As shown in the figure, mistakes or bad design decisions made early in the project life cycle have the potential to increase the overall project cost very early in the life cycle, and will haunt all stakeholders involved in later phases of the building. Planning and design are without a doubt the best opportunity for realizing both cost savings and sustainability enhancement in a facility construction project. However, the most significant changes can be realized by expanding the rigor of the design process to save costs and improve sustainability *downstream*, i.e., in construction, close out, occupancy, renovation, and end of life cycle. The same principles apply to rehabilitation or retrofit projects – incorporating sustainability as a project objective early on is far less expensive than trying to do so after the fact.

Achieving Sustainability in Project Implementation

Two primary approaches are used to achieve sustainability as part of implementing a facility project: prescriptive standards, and performance-based standards. These approaches can be used throughout the building life cycle to aid in achieving the desired level of sustainability to be achieved. The following subsections describe each of these approaches in turn, along with their implications for the overall sustainability improvement of built facilities in general.

Prescriptive Standards for Incremental Improvement

Prescriptive standards are one common approach to assist designers in incorporating sustainable building technologies and strategies into their projects. Prescriptive standards work by telling designers exactly what to do to improve the sustainability of their

building. For example, the typical building code document is constructed as a prescriptive standard – it tells building stakeholders to install 2x4 studs 16 inches on center to construct a load-bearing stud wall. This standard enables builders to construct a wall that will stand up under all expected load conditions, without requiring the builder to derive the theory of structures or do detailed structural design calculations. This type of wall functions well in most situations, although it may be overdesigned for many of them. Nonetheless, given the calculational capabilities of most builders and enforcers of building codes, the easiest way to ensure that the wall will perform as desired is to follow the prescriptive standard in the code.

With respect to sustainable building technologies, many sets of heuristic statements and checklists exist to aid building stakeholders in increasing the sustainability of their facilities. Table 2 shows three examples of prescriptive standards taken from the literature on sustainable construction. These examples illustrate the principle of prescriptive standards – it's clear what should be done to comply with the standard, although that action may not be the most appropriate one to achieve the underlying goal of the standard. For example, not all sites are appropriate for the use of porous pavement systems – in Georgia, for example, some sites with significant clay soil layers underlying the pavement do not provide adequate infiltration rates for rainwater absorption, and the water simply permeates the pavement then runs off at the edges of the paved area. While this problem can be overcome with careful design, permeable pavement is not always the optimal solution for dealing effectively with stormwater runoff. Nonetheless, prescriptive standards offer the opportunity to incrementally improve the sustainability of a given facility by providing clear guidelines as to what specifically should be done.

Table 2: Examples of Prescriptive Standards from Selected Sources

Specification	Source
Use compact fluorescent light bulbs in interior fixtures.	(PTI 1996)
Use porous pavement to promote groundwater recharge.	(HOK 1995)
Use graywater for irrigation.	(PTI 1996)

Performance-Based Standards for Context-Specific Optimization

Performance-based standards are a second approach to increasing the sustainability of a facility project. Both immediate and long-term cost savings may also be realized by taking into account sustainability factors from a performance standpoint. Performance-based standards, in which the desired *behavior* of the facility is specified instead of specific materials or systems, can help to ensure that the desired quality of the facility is obtained while allowing designers the flexibility to take into account the interaction between and among the systems within the facility. For example, a common environmental goal is to reduce energy consumption of the building. If this goal is articulated as a performance standard (e.g. “the facility should exceed Model Energy Code requirements by 30 percent as demonstrated by whole building simulation”), designers can choose from whole palette of options that could meet the goal, some of which may be less expensive than a generic design applied to many situations. If the

designer is encouraged to optimize the design from a whole building perspective, the first cost of the building can actually be reduced while also reducing life cycle operational costs (Weizsacker et al. 1995; Pearce et al. 2000). Table 3 shows additional examples of performance-based standards from selected sources that correspond to the examples provided in Table

Table 3: Examples of Performance-Based Specifications from Selected Sources

Specification	Source
Exceed ASHRAE/IES standard 90.1-1989 by 30%.	(HOK 1995)
Design to achieve no net increase in the rate or quantity of stormwater runoff compared to pre-construction conditions.	(USGBC 2000)
Use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.	(USGBC 2000)

Performance-based standards can achieve optimized sustainability performance for a facility by maximizing the flexibility of designers to develop integrated solutions to achieve specified project goals. Design integration across building systems saves money by acknowledging the interdependencies among these systems. For example, if designers decide to improve the environmental performance of a building by using high performance, energy-saving windows, the size of the HVAC system can be reduced due to the reduced cooling load that must be supported. In addition, the size of the ductwork and/or plenum can be reduced proportionately, meaning that the floor-to-floor height of the building can be reduced, leading to a smaller overall wall area. If design is integrated in such a way that these improvements are made concurrently, then the savings from smaller HVAC plant, ductwork, and reduced wall area can more than offset the additional cost of the high performance windows (Hawken et al. 1999). The key to achieving these synergies in design is to provide performance-based design standards that emphasize the desired level of performance for the building, then suggest a variety of high-performing building system types and technologies that can be used to achieve them.

The approach demonstrated in this study for improving the sustainability of built facilities is based on a performance-based analysis of the sustainability of facilities. The three parameters of sustainability described in the first part of this document are used to specify operational levels of performance that can be evaluated for different states of the facility being analyzed. The next section describes this approach.

Systems-Based Sustainability Analysis for Developing Performance-Based Specifications

To conclude this document, this section describes the overall process of systems-based sustainability analysis that is used in this study. The following subsections describe how the ideal sustainability state of a facility system is defined and operationalized; how the status quo and proposed retrofit states are benchmarked and a gap analysis is used to identify areas for sustainability improvement; how Best Available Technologies and

Strategies (BATS) are identified that can improve the sustainability of the proposed retrofit state, and how a research agenda is constructed to support the research and development of better BATS that can increase the sustainability of future building projects.

Defining the Ideal Sustainability State of a Facility System

The first task of the research is to define the ideal sustainability state of Building 170 in terms of operational criteria. To accomplish this task, the systems-based model of sustainability is used that was described in the first part of this document. This model defines sustainability for a facility system (including everything on the facility site such as buildings, parking lots, landscaped areas and ecosystems, and stakeholders) as shown in Figure 7 and described by the following three criteria:

- Stakeholder Satisfaction Basic needs met
- Resource Base Impact No or neutral impacts
- Ecosystem Impact No or neutral impacts

To operationally define the ideal state of Building 170, each of these sustainability constraints must be defined for the specific conditions found in Building 170 and its context. For example, what are the basic expectations of stakeholders for Building 170? What are the operational conditions under which these needs will be met? Even more fundamentally than that, who are the stakeholders?

In terms of resource base and ecosystem impacts, two distinct sets of entities exist for which sustainability must be evaluated: the system itself (intra-system entities), and the context of the system (extra-system entities). As shown in Figure 1, only two ways exist for a system defined as such to impact sustainability: by changing the nature of the *system within its boundaries* (i.e., intra-system impacts), and by changing the nature of the *context* by virtue of the flows of matter and energy across the system boundary (i.e., extra-system impacts). Thus, operational definition of the second and third criteria above involves identifying what impacts will be felt on ecosystems and resource bases *on* the site in each of the three scenarios (status quo, proposed retrofit, and ideal), what flows of matter and energy will cross the system boundary in each case, and what impacts those flows will cause *outside* the system, both in the immediate time frame of the retrofit itself and in the long term life cycle of the facility. Specific activities within this task include:

- Identifying system stakeholders and articulation of their expectations and needs with respect to Building 170 via interview methods
- Identifying any on-site resource bases and ecosystems via site inspection and review of existing project documentation
- Identifying present and likely future cross-boundary flow types and their likely sources and/or sinks via interviews, site inspections, and review of existing project documentation
- Defining each sustainability constraint equation in terms of these specific variables relevant for Building 170, thereby defining the ideal sustainability state of the facility

The outcome of this task is a list of performance criteria defining the ideal sustainability state for Building 170, expressed in terms of inequalities and threshold values for each criterion.

Benchmarking the Starting Point for Sustainability Improvements

After the ideal sustainability state for Building 170 has been defined operationally in the previous task, the focus of the second task is to benchmark the present state of affairs with respect to each performance criterion used to define the ideal. In addition, the sustainability state of the proposed retrofit is estimated using the modeling results and findings of the charrette described in Tab 3.

Specific activities within this task include:

- Measuring and/or predicting the degree to which stakeholder needs/expectations identified in Task 1 are/will be met in the status quo and proposed retrofit scenarios via document review and interviews
- Cataloguing and/or predicting condition of on-site resource bases and ecosystems in the status quo and proposed retrofit scenarios via site inspection, document review, and interviews
- Estimating quantities and impacts of cross-boundary flows in the status quo and proposed retrofit scenarios via simulation, document review, and interviews
- Calculating net ecosystem and resource base impacts for each of the scenarios

The outcome of this task is two sets of values for each of the performance criteria defined in the first part of the research, corresponding to the status quo case and the proposed retrofit case. At this point, three sets of data are available on which to perform gap analysis, corresponding to the sustainability performance of the ideal, status quo, and proposed retrofit states. The performance of each of the states is defined in terms of operational variables that describe the context-specific requirements for Building 170. Gap analysis consists of placing the three values for each variable on a continuum to determine if sustainability threshold requirements have been met.

The outcome of the gap analysis is a comparison of the three states of the facility system in terms of sustainability performance criteria. Of particular interest is the degree to which the proposed retrofit state meets or exceeds minimum sustainability requirements. Any criteria that are not met in the proposed retrofit state are identified. Bearing in mind that all technologies, strategies, and subsystems of the buildings are interconnected in terms of their sustainability impacts on the facility system as a whole, the factors that most influence the unmet criteria will be identified as candidates for possible improvement in the next phase of analysis.

Articulating Sustainability Improvement Opportunities

After areas for potential sustainability improvement have been identified in the earlier steps of the study, the next step is to review existing Best Available Technologies and Strategies (BATs) to determine if changes to the proposed retrofit state can be applied to improve its overall sustainability performance. Specific steps within this task include:

- Articulating the driving factors that cause sustainability performance requirements to be unmet in the proposed retrofit state, i.e., constructing impact chains that lead back to the original causes of net negative impacts for each unmet criterion identified in the previous phase of the research.
- Searching Georgia Tech's Heuristics Database, the literature, world wide web, and other sources of information for existing technologies or strategies to improve the sustainability performance of the proposed retrofit state to a point at which the thresholds have been met or exceeded
- Estimating the influence of these candidate technologies and strategies on sustainability performance of Building 170 via modeling, simulation, and/or other predictive methods of determining changes in driving factors

The outcome of this portion of the study is a comparative sustainability analysis of the effects of applying best available technologies to improve sustainability performance for criteria that are not met in the proposed retrofit state. Sustainability performance criteria that cannot be met with best available practices are also identified as an input to the development of a research agenda in the last part of the study.

Analyzing and Prioritizing Solutions for Improving Sustainability

Cost is an eventually significant consideration in all decisions made to retrofit Army facilities. However, the situation used to demonstrate the systems-based analysis process in this study is unique in that AEPI would like to identify the whole spectrum of sustainability improvement opportunities *before* considering cost as a possible constraint. Since AEPI has explicitly stated that it does *not* want cost to be an initial constraint on seeking sustainable solutions, any consideration of costs associated with proposed changes to Building 170 will be avoided until feasible configurations of sustainability improvement options are identified and analyzed in terms of sustainability gain.

At this point, three specific states of the facility have been defined, and a successful gap analysis has identified a variety of candidate technologies and strategies that can move the proposed retrofit state of the facility closer to the ideal sustainability state. The challenge of this step in the study is to identify combinations of strategies and technologies that can be considered for comparative analysis in terms of real costs and benefits vs. improvement in sustainability (i.e., "bang for buck" analysis). Specific steps within this task include:

- Developing specifications for technology and strategy combinations identified in the previous step that produce the greatest improvement in sustainability performance
- Identifying the direct and indirect qualitative and quantitative costs associated with each combination over its life cycle
- Identifying likely cash flows over the life of the facility that will be available for its construction, operation, maintenance, and eventual end of life cycle, as well as for all other costs that could be associated with the facility (e.g., staff productivity cost factors)

- Determining which configurations of sustainability improvements may be feasible given the likely cash flows related to the building, and prioritizing configurations (and individual technologies and strategies, if appropriate) according to sustainability improvement per cost or other metrics/constraints
- Validation of findings via interviews with facility stakeholders to determine the preferences and feasibility associated with each proposed configuration
- Recommending specific configurations of sustainability technologies and strategies to be used for the Building 170 retrofit

The outcome of this part of the study is a set of recommendations for improving the sustainability of the proposed retrofit state of Building 170 developed in the sustainable design workshop in prior work. These recommendations are supported by cost-benefit and sustainability analysis to illustrate the sustainability impacts per unit investment of each feasible configuration investigated.

Acknowledging Areas where More Research is Needed

The final step in the research study is to develop an agenda for the research and development of new sustainable building technologies and strategies that are needed to further improve the sustainability of buildings like the one investigated in this study. This goal will be achieved by reviewing areas in which the best available technology cannot meet the performance requirements for facility sustainability in the context of Building 170. Relevant factors will have been previously identified using impact chain analysis, along with the specific drivers that control performance for each area. Based on the performance requirements for facility sustainability, this task develops performance-based specifications to define what future technology should be able to do in order to result in a truly sustainable showcase facility. Specific activities within this task include:

- Articulating sustainability performance needs not met by best available technologies and strategies in terms of performance-based specifications
- Identifying and describing drivers of performance in the context of both Building 170 and facilities in general for each of these performance needs
- Developing performance-based specifications to guide future research and development that can result in the needed technologies and strategies
- Generalizing these overall findings into a research agenda for research and development of sustainable facilities technologies and strategies

The outcome of this task is a list of performance-based specifications for technology yet to be developed that can improve the sustainability of not only Building 170 but also other Army, federal, and private sector facilities.

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Tab 3

Building 170: AEPI's Sustainability Showcase

Building 170: AEPI's Sustainability Showcase

This chapter describes the features of Building 170 at Ft. McPherson, the case study to be used throughout this research to illustrate the process of systems-based sustainability assessment. The chapter begins by presenting a typology of capital projects adapted from Vanegas et al. (1998), and showing how Army construction maps out according to project type and sector. The specific characteristics of Building 170, including its history, stakeholders, building attributes, and context attributes, are presented to provide a point of reference for relating this project to other kinds of capital projects undertaken by the Army. The chapter concludes by presenting findings from prior studies on this building, to characterize the point of departure for this research project.

Building 170 as an Example of Army Construction

Since Building 170 at Fort McPherson has been selected as the case study to demonstrate the method of systems-based sustainability analysis in this project, an important step is to show how Building 170 fits within the entire spectrum of facilities constructed by the Army. The following subsections present a generic typology of capital projects that can be used to classify and characterize the kinds of facility construction and existing facility stock of the Army, a characterization of Building 170 as an appropriate example of a significant segment of Army capital facilities, and considerations for generalization of findings from this building type to other facility types owned and operated by the Army.

A Typology of Capital Projects

To begin the task of showing how Building 170 fits within the total capital facility inventory of the Army, Figure 1 establishes a typology of built facility projects onto which Army projects can be mapped. The typology in Figure 1 is an exhaustive classification of general construction project types. Facility projects can fall within one (and sometimes more than one) class within the table; Building 170 is a project of this type. The following subsections describe each class in the two-dimensional typology, beginning with sectors along the horizontal axis, followed by project type on the vertical axis.

Land and Real Estate Development – The first sector of facility projects are land and real estate development projects. These projects may contain other sectors of buildings such as residences and commercial buildings, but they are distinguished from these individual sectors by virtue of the fact that multiple buildings (e.g., residences, stores, offices, etc.) plus the infrastructure to link them together (e.g., sewer, water, power, streets, etc.) are being built in a unified and coordinated fashion.

Building Construction – the sector of building construction includes light- and medium-scale commercial buildings used by multiple people. This sector includes office buildings, warehouses, skyscrapers, retail buildings, schools, hospitals, and other types of non-specialized buildings used by commercial enterprises, the general public, and/or the public sector.

Industrial Construction – industrial facilities include specialized construction designed and built to serve a specific industrial purpose. These facilities house industrial processes and include refineries, chemical plants, manufacturing facilities, facilities for the repair and maintenance of equipment, and power plants.

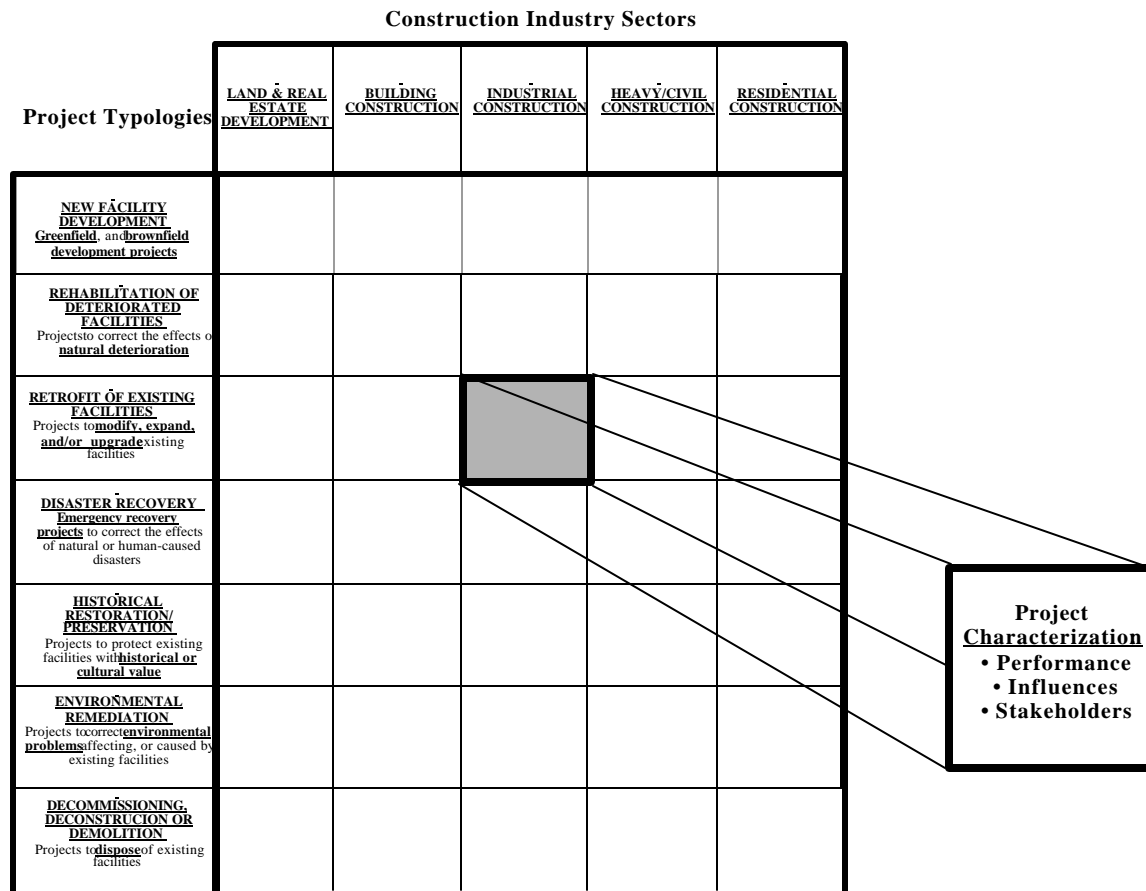


Figure 1: A Typology of Capital Projects (Vanegas 1999)

Heavy/Civil Construction – civil or “heavy” construction includes large-scale infrastructure projects such as dams, highways, pipelines, and sewage and stormwater conveyance systems. These projects, typically publicly owned, serve many individuals over long time frames, and provide services to the general public as well as industry and other special interests.

Residential Construction – the last sector, residential construction, includes any facility in which people reside on a long-term basis. This sector is traditionally divided into single family residential and multi-family residential, with multi-family housing including apartments, condominiums, dormitories, etc. Hotels, while serving as residences for people on a short-term basis, typically fall into the building construction sector rather than the residential sector.

New Facility Development – new facility development involves the creation of a new facility in a place where a facility presently does not exist.

Rehabilitation of Deteriorating Facility – the second project type, rehabilitation, involves fixing or reversing damage to an existing facility to bring it to some desired standard of performance in accordance to its existing use. A subset of rehabilitation is remodeling, which is typically considered to be repair or replacement of building components with ones of equivalent use, often for cosmetic purposes.

Retrofit of Existing Facility – in contrast with rehabilitation, retrofit of existing facilities involve changing the facility to accommodate different uses than those for which it was originally designed.

Disaster Recovery – disaster recovery includes all projects from other categories (e.g., new facility development, rehabilitation, demolition, etc.) that are undertaken in response to damage caused by a disaster. Disasters include hurricanes, tornadoes, floods, fires, and other large-scale damaging events.

Historical Restoration/Preservation – this special class of projects often overlaps with other categories such as rehabilitation and involves reversing damage or decay of a historically-significant facility to restore it to its original condition. Scope of this project type can range from complete restoration of all building systems and features with historical equivalents, to preservation of externally visible elements with visually compatible substitutes while changing the inside of the facility. Historical preservation is a specialized subset of this category and involves using specialized techniques to minimize or slow decay of original historical materials.

Environmental Remediation – environmental remediation includes all projects in which contamination or damage has occurred to the human or natural environment as a result of human activity and is being cleaned up or mitigated in some way. This class of projects includes brownfield cleanup, soil remediation, habitat restoration, lead and asbestos abatement, and other such projects.

Decommissioning/Deconstruction/Demolition – the final category includes all projects in which all or part of a facility has reached the end of its useful service life and is being shut down, taken apart, and/or removed from the site in some way. This category may also include environmental remediation of the site after facilities have been removed.

Building 170 as an Exemplar

Building 170, the case study used throughout this project, is an example of the building construction sector and falls into the classes of rehabilitation/retrofit of existing facilities, environmental remediation, decommissioning/deconstruction/demolition, and historical restoration/preservation. As a historically significant structure, Building 170 is part of a larger neighborhood of real estate development that comprises the historic district of Fort McPherson. Since the intended use of the facility (as office space) is different from its original use (as a hospital/clinic), it falls into the category of retrofit construction. Some systems, however, are intended to be preserved, rehabilitated, or restored to their original use or condition, and these elements of the project fall within the classes of rehabilitation (e.g., of the roof system) and historic restoration/preservation (e.g., exterior shell, windows, etc.). Finally, some elements of the building will be demolished (e.g., selected

interior partitions and some additions/changes that have occurred since the building's original construction like suspended ceilings).

Building 170 is an exemplar of a significant portion of the Army's existing capital facility stock. Over the years of its existence, the Army has constructed many facilities that still exist today, a large portion of which can be classified as historically significant facilities. What to do with these buildings is a significant question that must be addressed by the Army. The buildings, while not often in condition to be used for modern purposes, are worth preserving both for the sake of history and also because their construction in many cases is better than can be replicated economically today. The Army is interested in finding ways to adapt these facilities to the needs of the modern Army while preserving their historical value and honoring the quality of their construction.

As an example of a building that must be rehabilitated to meet the modern performance expectations of its new occupants while observing constraints on historical integrity, Building 170 is a test case for finding better ways to deal with adaptive reuse of historical structures in the future. As an existing building, it does not have as many degrees of freedom for optimizing sustainability performance as would a new structure. The need to interact with existing systems that will be preserved from the original facility poses additional challenges. However, since a large portion of the building will be preserved in place, the building has the potential to be more sustainable than a comparable newly-constructed facility since it will not require as much influx of materials and energy to create its structure, enclosure, and other systems.

Considerations for Generalization of Findings

The findings, i.e., recommended sustainability improvements, for Building 170 are expected to be generalizable to similar projects, both at Fort McPherson as well as at other installations. Selected findings will be culturally and contextually specific to the southeast location of the project, such as heating, ventilation, and air conditioning recommendations, insulation, and water-related findings. However, the process of identifying critical performance requirements to achieve sustainability and then searching the set of available technologies to identify those that meet the requirements will be generalizable to all other facility projects.

In order to generalize the process to new construction (in which a baseline building does not already exist), alternative states of the proposed facility must be simulated in order to provide a point of comparison among options. Sustainability constraint equations are imposed in the same way, although the degrees of freedom for a facility still on paper are much greater than for an adaptively reused facility in which many constraints are already fixed.

Features of Building 170 that will need to be specifically addressed and adjusted to generalize findings to other project types include:

- Climate-driven features – including HVAC systems, water systems, insulation of shell, and suitability for solar- and wind-based design
- Site-driven features – including terrain, landscaping, plantings, foundations, and hardscape

- Architectural features – including appearance and historical integrity of externally visible materials and systems
- Stakeholder requirements, objectives, and intended use – including the need for information technology systems, collaborative work areas, interpretive displays, quiet work environment, power supply requirements, and access
- Project size – including HVAC systems, power requirements, and structural requirements
- Availability of resources – including funding for project features, potential for collaboration with local vendors and manufacturers, skill of labor and other expertise, and availability of specialty materials and systems
- Availability of infrastructure – including transportation systems, power, water, wastewater, solid waste disposal, and other systems required for ongoing function
- Socio-political and regulatory environment – including governing codes and regulations, receptiveness and potential constraints and contributions of occupants, A/E/C stakeholders, local community, and other stakeholders

History of Building 170

Building 170 has seen a variety of modifications and adaptations since its original construction in the late 1920s and early 1930s. The following subsections describe the history of the building that has brought it to its present state: an abandoned, historically significant structure.

Construction of Building 170

Building 170 was constructed in two phases in 1929 and 1933 as two separate buildings – 170A to the north, and 170B to the south, respectively. In 1939 a second-story bridge was added to connect the two buildings across the breezeway space separating them. In most respects, the buildings mirror each other in exterior enclosure, window location, and floor plan. Both buildings were constructed as two story masonry structures with subsurface basements. Unique or unusual characteristics that distinguish this building due to the construction means, methods, and materials used at the time it was built include:

- Structural brick exterior with terra cotta tile and plaster interior wall face
- Wood frame single pane windows with true divided lights
- Transom windows above interior doors to facilitate daylighting
- High ceilings (approximately ten feet)
- Slate roof set on timber frame and wood decking
- Relatively large overhangs that provide shading to second-story windows
- Use of asbestos-containing materials (ACMs) for thermal insulation, floor tiles and adhesives, linoleums, ceiling tiles, window caulks, and roofing materials (verified by 1995 asbestos survey – Precision Environmental Management, Inc. 1995)

- Use of lead-based paint (unverified; expected to be encapsulated by subsequent wall finishes)

Building 170 as a Hospital

The original intended use of the facility was as a hospital, medical clinic, and sick ward for the soldiers stationed at Fort McPherson. As such, the facility (both wings) is subdivided into many smaller examination rooms or wards (a significant portion of which have their own bathrooms or showers), specialty areas for X-rays and laboratory analysis, office areas, and waiting areas. Later drawings from the last phase of the building's use as a hospital show a continuation of these functional use patterns, with many small exam rooms and laboratory spaces on the first floor and small exam rooms and offices on the second floor. The east part of Building 170A on the second story is devoted to an open office space that is presently divided by temporary partitions. The basement of Building 170A is primarily devoted to office space and file storage, while 170B's basement consists of a pharmacy area, storage, and waiting area. Both basements have access via steps to the outside of the building.

Unusual characteristics that distinguish this building due to its use as a hospital include:

- Space significantly subdivided into small spaces originally devoted to examination rooms, many of which have their own bathroom facilities or sinks and some of which include showers
- Linoleum, VCT, asbestos, and ceramic tile, terrazzo, and marble finishes in many areas for hygienic purposes – easy cleaning and sterilization
- Vertical chases for waste conveyance
- The potential for contamination from mercury and other metals due to equipment such as thermometers and other medical supplies and equipment
- Remaining cabinetry, countertops, and equipment (e.g., bedpan washers) specialized for medical purposes

Interim Modifications and Adaptations

The building served as a hospital/medical building between its construction in the 1930s until approximately 1997. During that time, various systems in the building were upgraded or modified, and significant modifications were made to the space between the buildings. These include:

- Addition of a first floor enclosed space beneath the breezeway connecting the two buildings, situated over a crawl space
- Addition of connectors to other buildings to the north and to the west (the building to the west has since been demolished, but the connector remains)
- Addition of an ambulance ramp to provide access (replaced original stairs) to the south side of Building 170B
- Addition of fiberglass insulation (approximately 1/2 inch) in the attic areas and additional insulation in the roof over the connector

- Infill of many basement windows with brick (presumably for security purposes)
- Addition of suspended ceilings throughout most of the building to hide mechanical systems and isolate deteriorating plaster ceilings
- Addition of a natural gas-fired boiler (efficiency estimated by Southface to be 70-75 percent) for heating and a 110-ton Trane air-cooled chiller with reciprocating compressors (Energy Efficiency Rating estimated by Southface to be 8.0 - 8.5). Hot and cold water are distributed to air handlers and fan-coil units via a two-pipe system.
- Addition of an electric tank-type hot water heater (efficiency estimated by Southface to be standard) to provide hot water for sinks, showers, and washing equipment
- Addition of an automatic sprinkler system to cover approximately 20% of floor area
- Addition of carpet of various types (including indoor/outdoor carpet in some areas) to selected areas; most is presently in very poor condition
- Addition of nonstructural partition walls (typically used in open office configurations)
- Addition of nonstructural stud walls with sheetrock or vinyl wallboard facing to subdivide some areas
- Upgrade of electrical and communication systems (still insufficient for anticipated uses)

Present State: An Abandoned, Historically Significant Structure

After the variety of modifications and normal use over its approximately seventy year life to date, Building 170 presently exists in a state of disrepair and has not been used as a hospital since 1997. As described in greater detail in the rest of this document, many of the building's interior finishes have fallen into disrepair due to delayed or insufficient maintenance. The buildings have not been updated to meet current standards in terms of life safety, handicap accessibility, lighting, wiring, communications systems, or elevators. Several known hazards or threats to indoor environmental quality have been identified and will require mitigation, including:

- Asbestos-containing material in thermal insulation, floor tiles and adhesives, linoleums, ceiling tiles, window caulks, and roofing materials
- Pigeon droppings in attic spaces (pose a viral and bacterial hazard)
- Lead-based paint (must be managed during construction)
- Mold and mildew in basement spaces due to inadequate ventilation and moisture protection

Despite these insufficiencies, Building 170 is a cornerstone of Fort McPherson's historic district and has significant potential to be adaptively reused for new uses while maintaining its historical integrity and taking advantage of its sound construction.

Stakeholders: Their Roles, Objectives, and Constraints

The stakeholders involved in this project can be categorized into five principal classes: future tenants (AEPI personnel and their guests), future landlords (Ft. McPherson operations personnel), design and construction professionals (Army Corps of Engineers), context stakeholders (Ft. McPherson installation personnel and the community of Lakewood), and organizational stakeholders (FORSCOM and the Army at large). The following subsections characterize each of these groups of stakeholders, identify specific key individuals with significant roles within each group, and summarize the interests and objectives of each group with respect to the Building 170 project.

Future Tenants: AEPI Personnel and Guests

As the stakeholders who will be occupying the finished building on a day-to-day basis, the Army Environmental Policy Institute (AEPI) staff are the primary stakeholders of this project. Guests of AEPI will also occupy the building on both short- and long-term bases, ranging from civilian personnel to high-ranking military officials. Key AEPI personnel involved specifically with this project include:

- **Mr. David Eady** – the champion of Building 170 as a sustainability showcase and participant of previous studies of the building
- **Mr. John Wuichet** – a co-champion of Building 170 as a sustainability showcase and participant in previous studies of the building
- **Mr. Rick Sinclair** – a co-champion of Building 170 as a sustainability showcase and participant in previous studies of the building
- **Marty Lulof** – the administrative coordinator/office manager for AEPI operations
- **Rank (Ret) Dick Wright** – the interim director of AEPI
- **Col (Ret) Dan Uyesugi** – the co-director of AEPI

Key interests and objectives of this stakeholder group include (based on Southface 2000b):

- Creation of a comfortable and efficient, high quality workplace that promotes productivity and facilitates accomplishing the mission of AEPI
- Development of a showplace of sustainable building technologies that embodies the environmental values and goals of AEPI as an organization
- Compliance with Executive Orders 13101, 13123, 13148, and others
- Demonstration of the state of the art in sustainable construction to show what *can* be done in renovating historical buildings – the building is the briefing
- Preservation and enhancement of the historical neighborhood fabric at Fort McPherson
- Reduction or elimination of negative environmental impacts due to construction and operation of the new workplace

Future Landlords: Ft. McPherson Installation and its Personnel

Due to its location in Ft. McPherson's historic district, Building 170 is the ongoing responsibility of several key stakeholders among Ft. McPherson's command staff and civil engineering and environmental divisions. Specific stakeholders in this category include:

- **Col. William Clingempeel** – Garrison Commander of Fort McPherson and its sub-post Fort Gillem
- **LTC Mark Abernathy** – Director of Installation Support for Ft. McPherson; his staff will oversee all design and construction, environmental programs, historical programs, contracting, and operations and maintenance of Building 170
- **Mr. Dave Barber** – Environmental coordinator for Ft. McPherson
- **Mr. Roy Buice** – Facilities manager for Ft. McPherson
- **Ms. Beth Grashof** – In charge of historic projects at Ft. McPherson; deals with all projects involving historic preservation
- **Mr. Mike Hutt** – Project manager at Ft. McPherson; provides project support, cost management, and engineering/architectural services

The U.S. Army Garrison, Fort McPherson, has been “the Army’s presence in Atlanta” since its activation in 1885 (Phillips 1999). It hosts the main headquarters element of the largest Army combat command in the free world (FORSCOM), three other major Army headquarters, a large military retiree population, and 82 other military/government commands and activities located in 43 Georgia counties, 24 states, and two United States Territories (*ibid.*). Fort McPherson is strongly customer service driven, and considers these tenants to be their principal customers, including associated soldiers, family members, work force civilians, and retirees – approximately 121,000 in number including all supported populations.

The mission of Fort McPherson is “to provide a quality home and environment for our active and reserve forces, our retired military, and our families, and to provide our customers with world class installation service and support.” (*ibid.*, p. i). Its vision is “a total force sustaining installation that is business based and customer focused, always first in support, and proudly serving tomorrow’s Army today” (*ibid.*). Overall goals of Fort McPherson command are (Phillips 1999):

- A positive command climate
- Facilities excellence, sound infrastructure, customer logistical support, and environmental stewardship
- A synchronized and coordinated installation that employs trained leaders and workers
- A resource management approach that attains a most efficient organization and the best customer service
- A physically safe and secure environment for all customers

- First choice quality of life activities, services, and wellness programs for its soldiers, families, civilians, and retired military personnel.

Fort McPherson's mission as service providers of major equipment, facilities, and technologies is "to offer modern, safe, state of the art facilities and quality of life (QOL) programs and services which are readily available, competitively priced, and prompt...designed to the customers' expectations" (Phillips 1999). Within this overall facilities mission, project-specific interests and objectives include (based on Southface 2000b):

- Minimization of ongoing operation and maintenance requirements and costs
- Compliance with Executive Orders 13101, 13123, 13148, and others
- Preservation and enhancement of the historical neighborhood fabric at Fort McPherson
- Control of initial construction costs and minimization of barriers to successful completion of construction
- Demonstration of the state of the art in sustainable construction to show what *can* be done in renovating historical buildings – the building is the briefing

Design and Construction Professionals: Army Corps of Engineers

Since the retrofit and upgrade of Building 170 is of a significant magnitude in terms of cost, it has been classified as a MILCON project and is under the jurisdiction of the Army Corps of Engineers. The primary role of the Corps in this project is to provide architectural and engineering services for the building (all contracting will be overseen by operations personnel at Ft. McPherson).

Specific individuals from this stakeholder group have not yet been identified, but will be interviewed to identify their key interests and objectives for this project. Predicted key interests and objectives of this stakeholder group include (to be validated during stakeholder sampling):

- Control of initial construction costs and minimization of barriers to successful completion of construction
- Compliance with Executive Orders 13101, 13123, 13148, and others
- Demonstration of state of the art in sustainable construction – use this as a prototype case for new Corps standards, tools, and procedures

Context Stakeholders: Immediate Neighbors, Metro Atlanta, and the State of Georgia

A potentially significant group of stakeholders are neighbors in the surrounding communities, including the City of East Point to the south of the post and the City of Atlanta to the north. While specific impacts of Building 170 on the surrounding metro area and state is likely to be negligible, these people are subject to the concerns of the overall metropolitan Atlanta area and north Georgia region. Key interests and objectives of this stakeholder group include:

- Minimization of traffic congestion
- Minimization of negative impacts on air quality
- Minimization of negative impacts on water quality and quantity
- Smart growth – control of urban sprawl
- Economic development of the region

Organizational Stakeholders: FORSCOM and The Army at Large

As the Army division responsible for built facilities and installations around the world, Forces Command (FORSCOM) coincidentally maintains its headquarters at Ft. McPherson and has been an active participant in the Building170 studies conducted to date. FORSCOM has an interest in finding creative ways to deal with facilities like Building 170, and is particularly interested in developing processes that can improve how construction is done on installations in general. Key FORSCOM stakeholders include:

- **Mr. Ray Stoudenmire** – head of FORSCOM Engineering division
- **Ms. Mannette Messenger** – head of FORSCOM Environmental division and champion of the Army’s Environmental Master Planning process now being pilot tested at Ft. Bragg
- **Ms. Caroline Fischer** – From the Army’s Office of Historical Properties; was mentioned in the project kickoff meeting but I am uncertain of her classification or role in the project.

From a different angle, many senior Army leadership staff also have an interest in the success of this project, either through their organizational relationships with the Army Environmental Policy Institute or due to interest in built environment or sustainability issues. These Army senior leadership stakeholders include:

- **Mr. Ray Clarke** – oversees the Army Environmental Policy Institute
- **Hon. Mahlon Apgar** – Assistant Secretary of the Army for Installations and Environment

Key interests and objectives of this stakeholder group include:

- Development of a showplace of sustainable building technologies that embodies the best environmental values and goals of the Army as a whole
- Compliance with Executive Orders 13101, 13123, 13148, and others
- Demonstration of the state of the art in sustainable construction to show what *can* be done in renovating historical buildings – the building is the briefing
- Use of the finished product as an exemplar of excellence in sustainable construction to bring the Army to the head of the pack in this area
- Experimentation with new concepts under development such as Environmental Master Planning and others

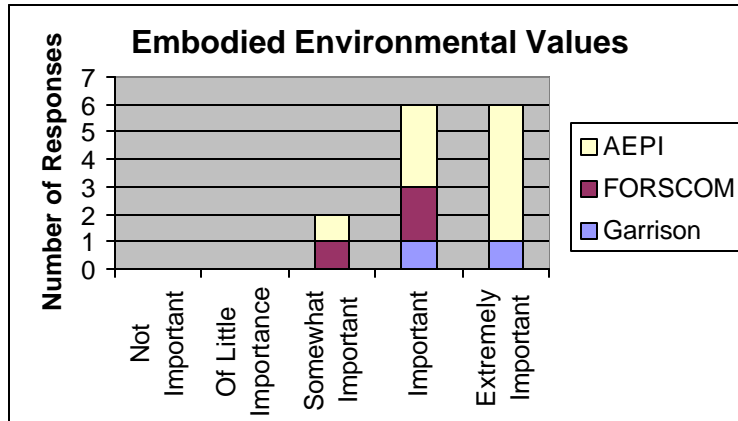
- Capture of lessons learned from this project to extend findings to other Army buildings

Summary of Compiled Baseline Stakeholder Surveys

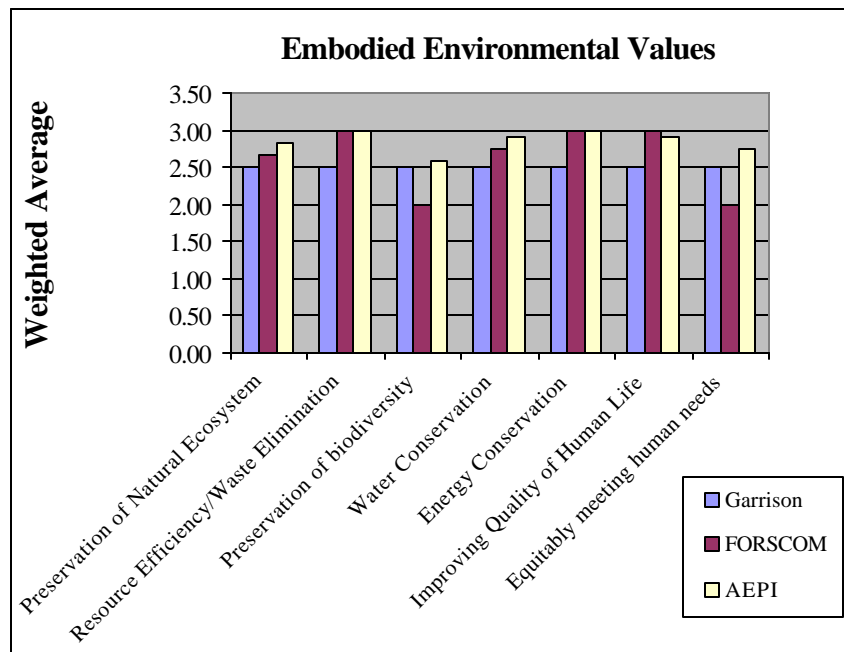
The following figures depict the results of the Baseline Stakeholder Survey for the three stakeholder groups sampled, AEPI, Fort McPherson DPW Garrison personnel, and FORSCOM. A copy of the Baseline Stakeholder Survey can be found under Tab 4 of the Resource Guide. A total of 13 completed surveys were received from AEPI personnel; a compilation of the surveys can be found under Tab 7 of the Resource Guide. A total of four completed surveys were received from Fort McPherson Garrison personnel; a compilation of the surveys can be found under Tab 5 of the Resource Guide. A total of five completed surveys were received from FORSCOM personnel; a compilation of the surveys can be found under Tab 6 of the Resource Guide.

Embodied Environmental Values

The below graph depicts the total number of responses from each stakeholder group when asked “How important, in your opinion, is it to have Building 170 exemplify the environmental values of the organization you represent?”

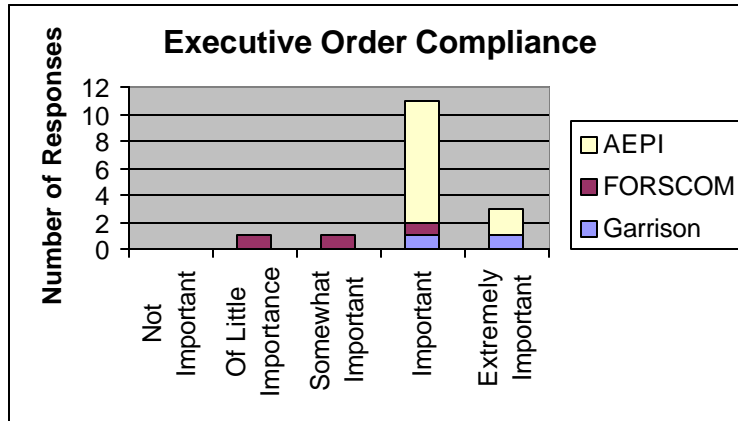


Each stakeholder was then asked to rate the importance of specific environmental values. The below figure shows the weighted average for each stakeholder group for the seven environmental values that were included on the survey.



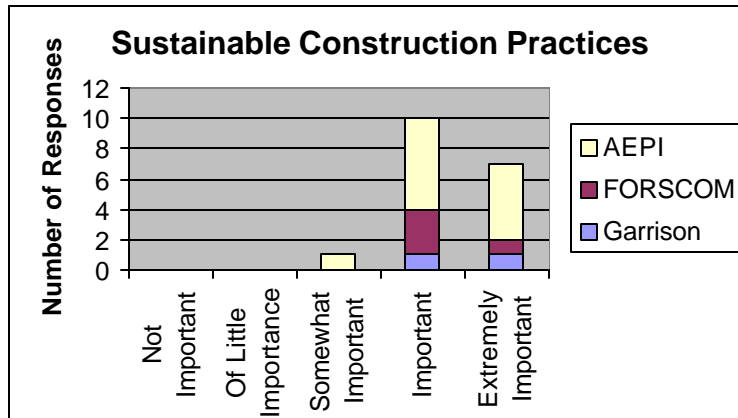
Executive Order Compliance

The below graph depicts the total number of responses from each stakeholder group when asked “How important, in your opinion, is Executive Order compliance for the Building 170 project?”



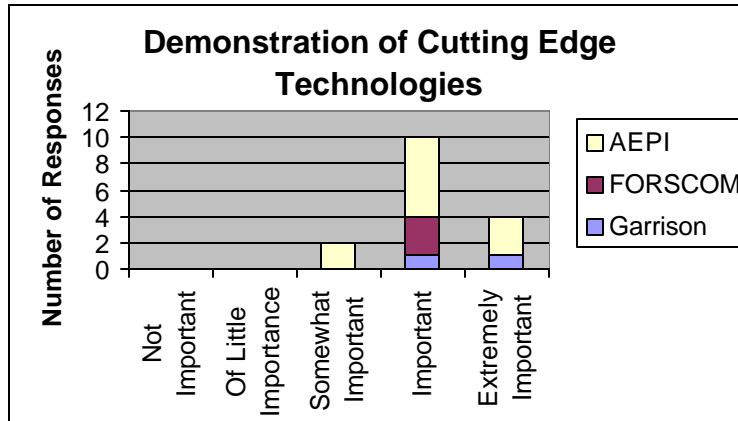
Sustainable Construction Practices

The below graph depicts the total number of responses from each stakeholder group when asked “How important, in your opinion, is it for the Building 170 project to become a premier example of sustainable construction practices?”

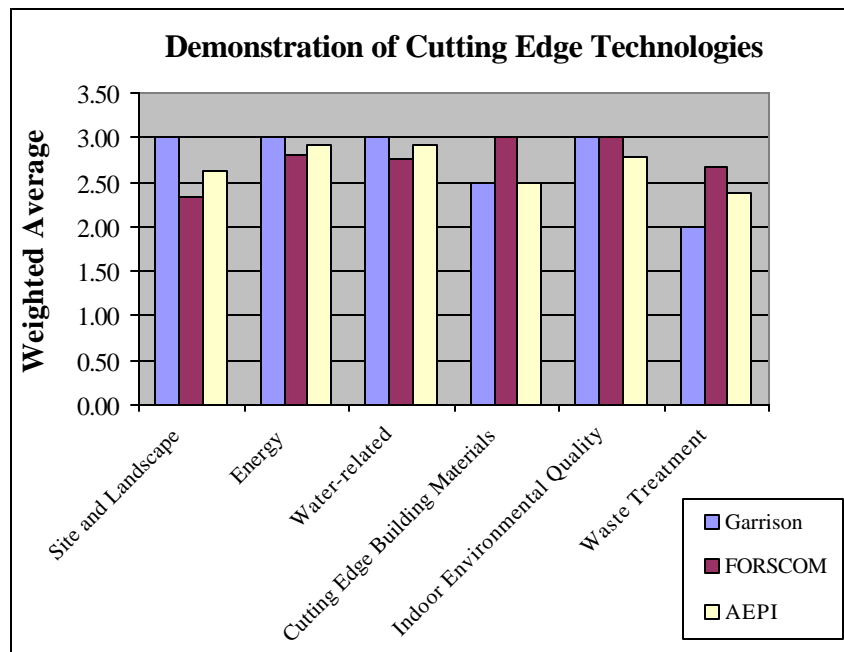


Demonstration of Cutting Edge Technologies

The below graph depicts the total number of responses from each stakeholder group when asked “How important, in your opinion, is it to demonstrate the use of innovative, cutting edge technologies in the Building 170 project?”

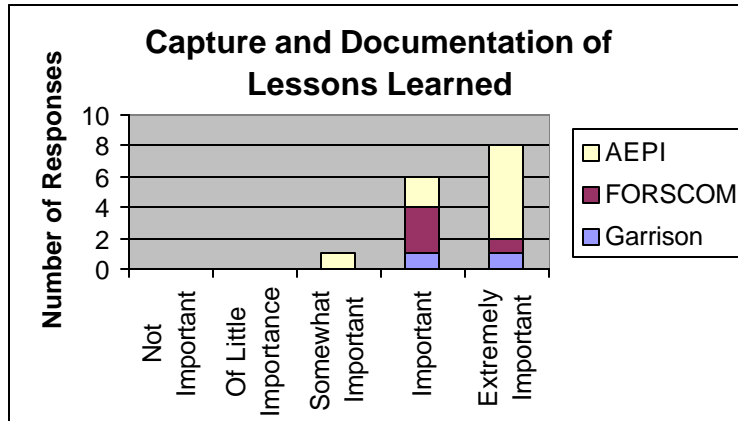


Stakeholders were then asked to rate the importance of demonstrating cutting edge technologies in specific categories. The below figure shows the weighted average for each stakeholder group for the six categories of cutting edge technologies.

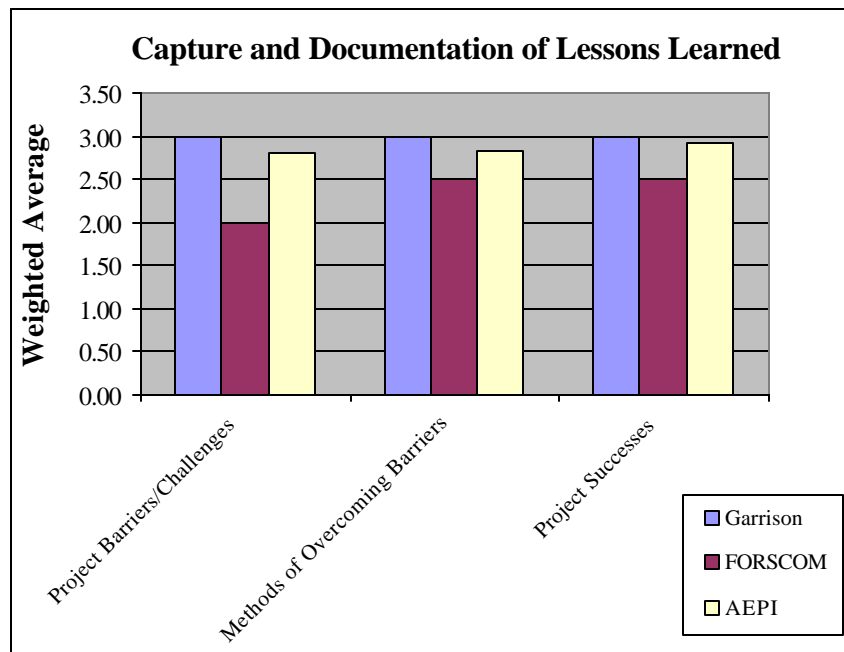


Capture and Documentation of Lessons Learned

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to capture and document “lessons learned” from the Building 170 renovation?”

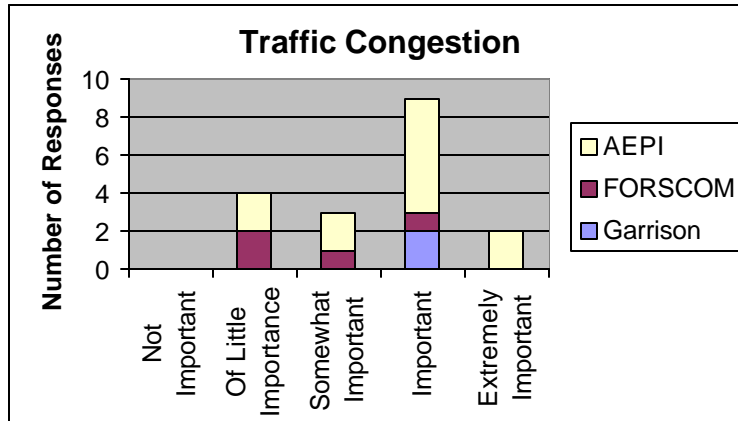


Stakeholders were also asked to rate the relative importance of specific types of lessons learned. The below graph depicts the weighted average for each stakeholder group for the three types of lessons learned.



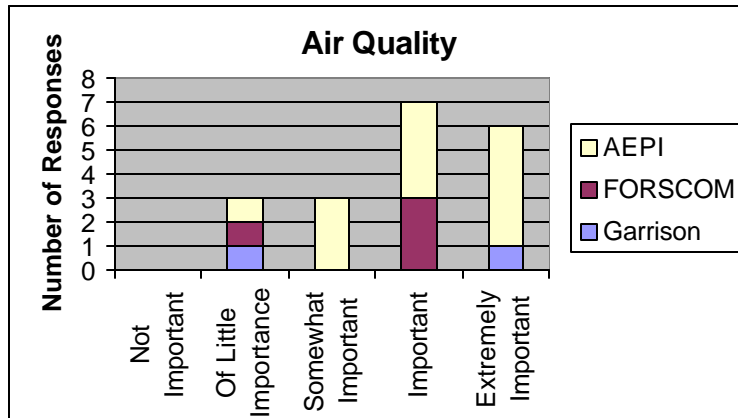
Traffic Congestion

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to minimize traffic congestion with respect to Building 170?”



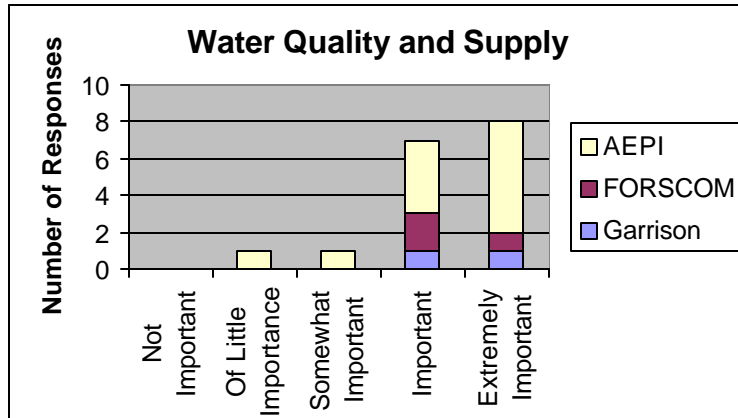
Air Quality

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to minimize the contribution of Building 170 to poor air quality?”



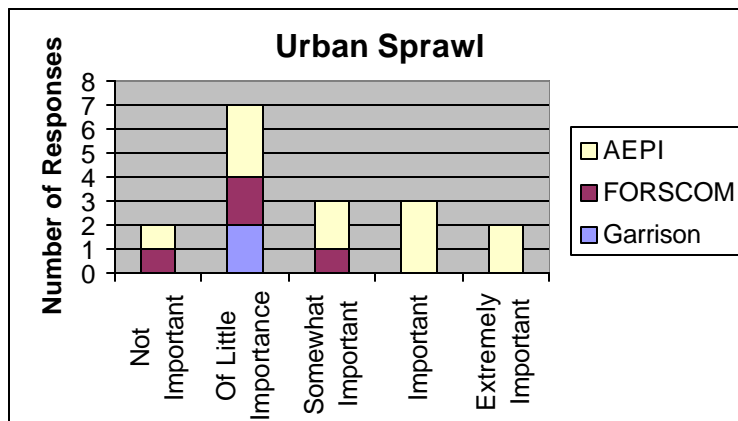
Water Quality and Supply

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to maximize the contribution of Building 170 to good water quality and to ensuring that sufficient quantities are available, to the greatest extent possible?”



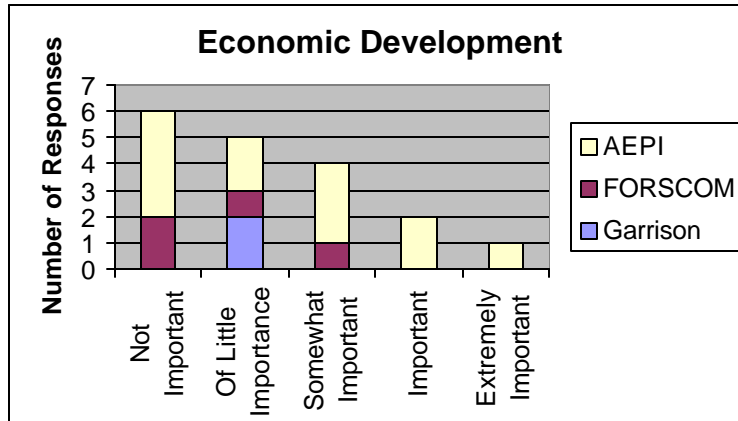
Urban Sprawl

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, for Fort McPherson to address urban sprawl efforts in the metro Atlanta area through its effort with Building 170?”



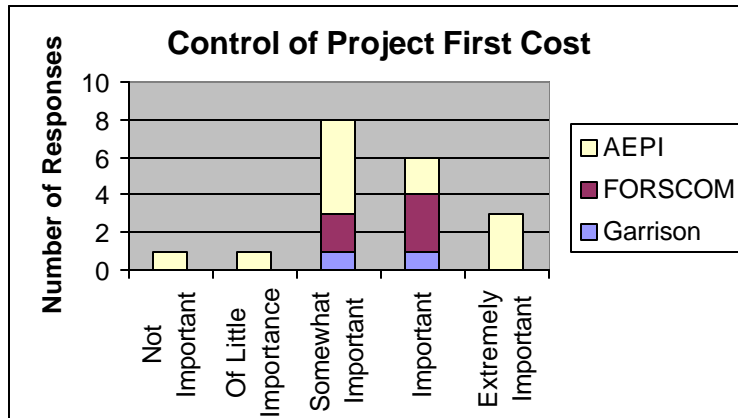
Economic Development

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, for Building 170 to contribute to economic development in the East Point and metro Atlanta areas?”



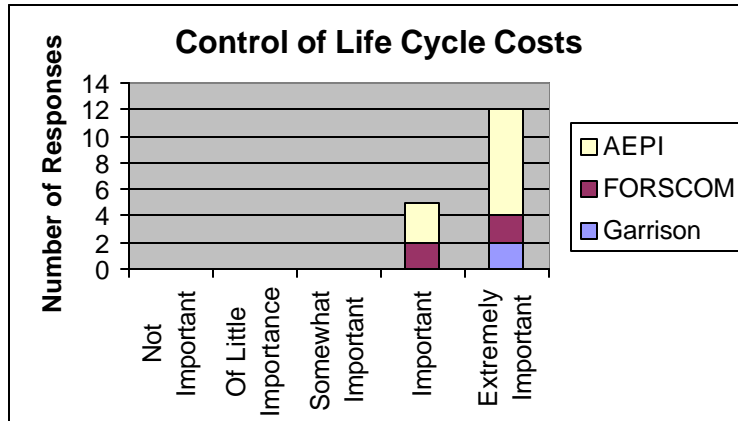
Control of Project First Cost

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to minimize the initial project cost of Building 170?”



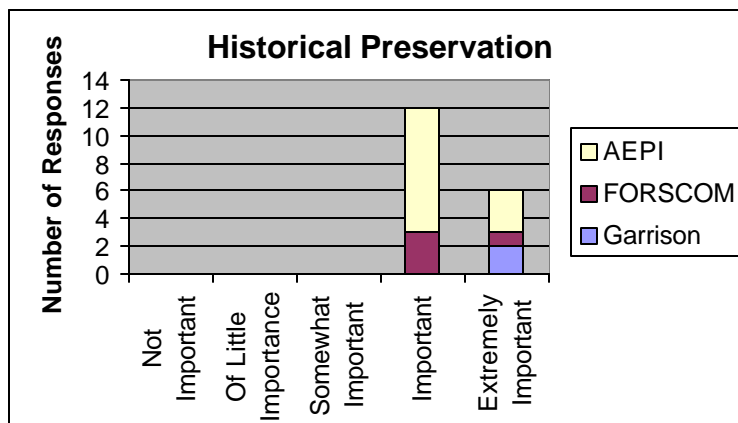
Control of Life Cycle Costs

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to optimize the life cycle cost of Building 170?”



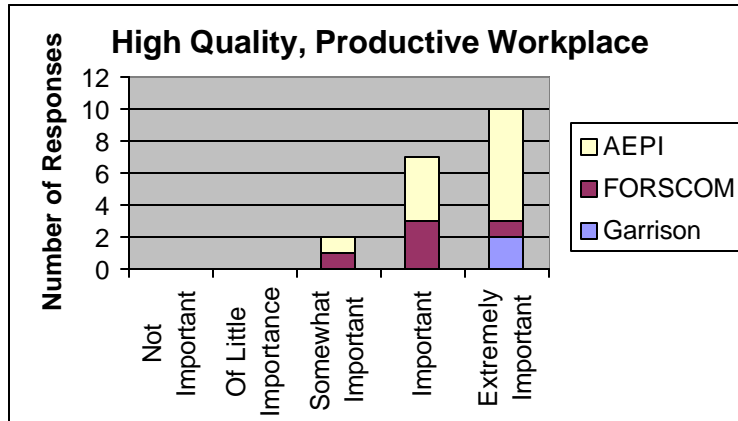
Historical Preservation

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to restore Building 170 (a historic structure) according to Federal and State historic preservation guidelines?”



High Quality, Productive Workplace

The below graph depicts the total number of responses from each stakeholder group when asked “How important is it, in your opinion, to renovate Building 170 into a high quality and productive work environment?”



Summary: Alignments and Potential Conflicts

While the prioritization and focus of specific goals differs based on the perspective of the stakeholder group being considered, significant alignment exists with respect to overall goals for this project. Table 1 highlights the goals of each stakeholder group to illustrate the overall alignment of stakeholders as a whole. As a point of departure for further analysis, no significant conflicts of goals have been identified, although tradeoffs will need to be considered as design and project implementation proceeds. Additional challenges may emerge as cost and logistical constraints (if any) emerge.

Table 1: Comparison of Project Objectives by Stakeholder Group

Objectives	AEPI	Ft. Mac Ops	Army Corps	Community	Army at Large
Embody environmental values	X				X
Executive Order Compliance	X	X	X		X
Demonstration of cutting edge technologies/strategies	X	X	X		X
Exemplar of best practices	X	X			X
Opportunity to experiment			X		X
Capture of lessons learned					X
Minimization of traffic congestion	X			X	
Minimization of negative air quality	X			X	
Good water quality and sufficient quantity	X			X	
Smart growth				X	
Economic development				X	
Cost control/successful construction		X	X		
O&M requirements/costs	X	X			
Historical preservation	X	X			
High quality, productive workplace	X				

Building Attributes

Having identified concerns of stakeholders related to the Building 170 project, the next step is to establish a point of departure in terms of existing conditions at the building. The following subsections provide a synthesis of the findings of prior investigations for major building systems, including site, substructure, superstructure, enclosure, interiors, mechanical systems, and electrical systems. This point of departure was based on reports and documentation listed in Table 2.

Table 2: Existing Documentation on Building 170

Title	Author	Date
As-built floor plans, elevations, and architectural details of original structure	Army	1939
Asbestos Survey of Building #170 – Fort McPherson	Precision Environmental Management, Inc.	1995
Site plans for area surrounding Building 170	Army	1998
Proposed demolition plan drawings and documentation	Army	1998
Sustainable Design Alternatives for Adaptive Re-use of Historic Structures: Case Study on Building 170, Fort McPherson, Georgia	Southface	June 2000
Adaptive Re-use of Building 170 – Sustainable Design Workshop Notes	Southface	June 2000
Form DD1391 – Building 170	M. Hutt, Ft. McPherson	July 2000
Sustainable Design Recommendations for Adaptive Re-use of Building 170 at Fort McPherson	Southface	July 2000
Building 170 at Ft McPherson Report Review	J. Vanegas, AEPI	August 2000
Resource list for Deconstruction Waste Recovery	B. Guy, U. Florida	Sept. 2000

Site

Notable features of the site include:

- Mature trees to the east of the building along the main street, with grass and ornamental bushes along the perimeter of the buildings
- East walkway to the central lobby area, covered by a metal awning and connected with steps to the lobby level
- East walkway to the north and south portions of the building, connected with steps to basement level and covered with metal awning
- Sidewalk along the east side of the building parallel to the street (good condition)
- Asphalt parking area to the south of the building (poor condition)
- Concrete ambulance ramp and access stairs (metal railings) to provide access to the south side of 170b (good condition), partially covered by metal awning
- Access stairways/ramps to basement levels on the west side of the building, partially covered by metal awnings

- Interior access corridor (formerly connected to another building) to the central lobby area on the west side of the building
- Miscellaneous ornamental bushes and turf grass on west, south (very limited), and north sides of the building, with few mature trees
- Concrete aprons, equipment pads, and some gravelled areas on the west side of the building
- Asphalt parking area across the street to the northeast of the building (fair condition), connected to the building area by a delineated crosswalk across the main street
- Storm drainage inlets at selected curb areas (connected to centralized stormwater collection system, presently used for golf course irrigation)

Substructure

The substructure of Building 170 includes foundations and basement slab and walls.

Foundations - As far as can be ascertained, the foundations of the building are structurally sound and stable.

Basement Slab and Walls – No significant cracking has been observed in either the basement slab or walls. However, moisture has accumulated in the basement portions of both Buildings 170a and 170b via capillary action through the walls and slab. This moisture has been attributed to inadequate storm drainage systems that do not direct stormwater away from the building foundations (Southface 2000b). Several downspouts around the building discharge rainwater directly into the foundation. This condition is likely responsible for high humidity and mold throughout the basement (ibid.). Additional conditions specific to the basement are discussed in Section 4.3 - Enclosure and 4.4 - Interiors.

Superstructure

The superstructure of Building 170 includes primarily its exterior structural brick walls and truss roof support systems.

Exterior Structural Brick Walls – The exterior wall systems of the building are in good condition. With minor exceptions, all mortar appears to be serviceable, although there are minor areas of efflorescence in some locations exposed to water. Mortar may require repointing at some point in the future as part of periodic maintenance of the superstructure. Any significant threats to the superstructure of the building will be mitigated by improving the stormwater handling system and repairing the roof.

Roof Support Systems – the roof system is supported by a wood truss system. It is presently in good condition. Any threats to this structure will be mitigated by ensuring the water-tightness of the roof itself.

Enclosure

The enclosure of Building 170 includes structural masonry walls (discussed in previous subsection), windows and doors, insulation, roof systems, and concrete block window infills at basement level.

Windows and Doors – Windows and doors are presently in fair to poor condition, particularly caulking around windows. In their present condition, these elements do not provide adequate barriers to air infiltration. However, as true divided light windows and original doors (for the most part), they contribute significantly to the historical character of the building. Caulking around windows has been found to be an asbestos-containing material (ACM) by an external testing agency.

Insulation – Portions of the attic include 1/2” fiberglass insulation batts, with areas over the connecting bridge containing somewhat more. No other insulation is present due to the structural masonry and terra cotta tile construction of the walls.

Roof Systems – Selected flashing materials, membranes, and sealants used in the roof system have also been found to contain asbestos. At the time of initial analysis, the roof was found to be in poor condition due to spalling and deterioration of the slate shingles, although it had not yet begun to seriously leak. It has since been decided to replace the entire roof with slate to match the original character of the building.

Concrete Block Window Infills – The fate of infills to basement windows remains undecided at this time. Infills were installed at some point in the building’s history to increase building security. They are in acceptable condition.

Interiors

The interior systems of Building 170 include interior wall finishes, nonstructural walls, floor finishes, ceiling finishes, interior doors and transom windows, furnishings, fixtures, and equipment.

Interior Wall Finishes - Interior wall finishes range from painted plaster on terra cotta tile, to vinyl wallboard and sheetrock in some retrofitted areas. Some interior wall finishes (e.g., vinyl wallboard) do not match the historical character of the building and will likely be replaced during the rehabilitation. Selected portions of the plaster finish are deteriorated and will need to be repaired. The presence of lead-based paint is strongly suspected and should be mitigated or actively managed during construction or repair. The interior of basement wall areas are painted concrete and have aesthetically deteriorated due to excess moisture in the building. They are likely to be contaminated with mold and mildew, which may be contributing to unpleasant odors in the basement area.

Nonstructural Walls - Some nonstructural walls were part of the original construction, and these are terra cotta tile with a painted plaster finish. Interior walls in bathrooms and shower areas also have ceramic tile or marble partially covering portions of the wall to facilitate cleaning and resist moisture. Additional nonstructural walls have been added since the original construction; these walls range from temporary full-height partition walls in portions of 170a to plasterboard-covered stud walls in other parts of the building. The condition of these walls varies significantly, and most are likely to be removed during renovation.

Floor Finishes - Floor finishes vary significantly throughout the building, and include:

- Linoleum tile (some still exposed, and some existing beneath other floor tile installed later)

- Floor tile (some vinyl composition, some asbestos-containing as determined by the 1995 asbestos survey) with some asbestos-containing adhesives
- Ceramic tile (primarily in bathroom and shower areas) in reasonably good condition
- Carpet (in selected areas, generally in very poor condition. Some indoor/outdoor carpet in poor condition is also located in the basement areas)
- Terrazzo baseboard along hallways (to facilitate cleaning)
- Vinyl baseboard along room perimeters

With the exception of flooring laid on top of other flooring (e.g., carpet and some floor tile), most flooring materials were adhered directly to the concrete slab floors with adhesives (much of which are asbestos-containing materials). The existing flooring system is highly heterogeneous and inconsistent from room to room. Large portions of many finishes are in poor condition. It is expected that much of the flooring will be removed during renovation, particularly all asbestos-containing floor finishes.

Ceiling Systems - At the time of initial analysis, much of the ceiling area was covered by a suspended ceiling system at a height of 8' that was installed to hide mechanical systems and mitigate the deteriorating original ceiling finish. This suspended ceiling system has since been removed and recycled. Additional areas of the ceiling are covered with adhered pegboard ceiling tile at the original ceiling height (approximately 10') in generally poor condition; many tiles are missing. This tile and adhesive were found to be non-asbestos containing during the 1995 asbestos survey. Some ceiling finishes have been water-damaged due to leaking or sweating water conveyance piping. An interstitial space between the bottom of the floor slabs and ceiling of the floor below (approximately ten inches) was part of the original construction and provided horizontal chases for piping and conveyance. It is suspected that this space will be insufficient for retrofitted mechanical systems, although it may provide enough space for new wiring, communication, and sprinkling systems. Access to this area after renovation is complete may pose a challenge to its effective use.

Interior Doors and Transom Windows – Many of the interior doors are original and would be difficult or expensive to replace. Many interior doors between the offices and corridors have transom windows to allow natural daylight to illuminate circulation areas, although the later installation of suspended ceilings largely eliminated this feature. Newer doors include solid-core wooden doors on metal frames, most of which are in good condition.

Furnishings, Fixtures, and Equipment (FF&E) – Few furnishings remain in the building, and what remains is likely to be removed during renovation and replaced. Fixtures and equipment include specialized cabinets that were used for storage of medical supplies, countertops, and unique fixtures such as a bedpan washing system in Building 170b. Toilet, shower, and sink fixtures exist in abundance throughout the many bathroom spaces in the building. All water-related fixtures likely exceed the flow rates required by the 1992 Energy Policy Act and will have to be replaced during renovation. The condition of FF&E varies widely throughout the building. AEPI has expressed an interest in retaining some of the FF&E and either displaying it or integrating it into the design in some alternative way, to respect the original use of the building as a hospital.

Mechanical Systems

Mechanical systems in Building 170 include Heating, Ventilation, and Air Conditioning (HVAC) systems, fresh water supply and water heating systems, wastewater conveyance systems, and fire suppression systems.

HVAC Systems – Current heating of the building is provided by a natural gas-fired boiler (efficiency estimated by Southface to be 70-75 percent). Cooling is provided by a 110-ton Trane air-cooled chiller with reciprocating compressors (Energy Efficiency Rating estimated by Southface to be 8.0 - 8.5). Hot and cold water are distributed to air handlers and fan-coil units via a two-pipe system. Piping is primarily cast iron, and much of the supply piping is insulated with asbestos-containing materials. Some of the pipe insulation has significantly deteriorated due to age and condensation around pipes. No active ventilation system presently exists in the building, and air changes are provided by passive infiltration of the building envelope.

Fresh Water Supply and Water Heating Systems – Fresh water is provided to building fixtures via copper supply piping, assumed to be in sound condition. One possible concern is the use of lead-based solder in the joints of this piping, but this problem is endemic to older buildings and is unlikely to be cost-effective to mitigate, given its reasonably benign effects. Water heating is provided by a “fairly new” electric tank-type hot water heater (efficiency estimated by Southface to be standard), which provides hot water for sinks, showers, and washing equipment.

Wastewater Conveyance Systems – Wastewater conveyance piping is primarily cast iron due to the age of the building; however, some runs of 4” PVC piping were noted in the basement during a building walk-through. While local building codes permit PVC wastewater conveyance piping, some of this piping may be replaced with cast iron during retrofit.

Fire Suppression Systems - Approximately 20% of floor area of the building is covered by an automatic sprinkler system added later in the building’s life. The adequacy of this system is unknown at this time, but is assumed to meet code requirements in terms of supply and activation mechanisms for the area covered by sprinklers. The remaining 80% of the building will need to be sprinkled to meet life safety codes, and additional measures will need to be enacted with respect to building stairwells to meet these codes.

Note that no mechanical conveyance systems presently exist in Building 170. To comply with Americans with Disabilities Act (ADA) requirements and life safety code requirements, one or more elevators must be installed. Additional provisions for disabled access will include ramps in one or more locations around the building to facilitate entry to both portions of the building.

Electrical Systems

The electrical systems in Building 170 include lighting, electrical wiring, telecommunications systems, and computer network infrastructure.

Lighting Systems – Lighting in the building is presently provided by a combination of fluorescent fixtures, incandescent fixtures, and natural daylighting. Lighting systems in

the building have evolved to be heterogeneous over time due to differential retrofit of the building for varying purposes. All lighting is switch-controlled.

Electrical Wiring – The condition of electrical wiring in the building is assumed to be code compliant for the building's former use. However, it will likely be inadequate for future uses of the building. Additional electrical outlets and higher capacity service are likely to be needed. The extent to which the building itself will need to be rewired is unknown at this time, but is expected to be significant.

Telecommunication Systems and Computing Network Infrastructure – Limited telecommunication systems are installed in the building at present, but will need to be expanded to accommodate future use. No infrastructure exists for computer networking in the building at this time. Such infrastructure will need to be provided to accommodate future uses of the building.

No significant security, monitoring, or control systems presently exist in the building. The degree to which these systems will be required depends on future uses of the building and design factors such as type of HVAC system selected.

Context Attributes

Having established the existing condition of the building itself, the next step is to describe the attributes and condition of the infrastructures that support its operation. Physically, Building 170 is located in the historic district of Fort McPherson, a 487 acre Army Post in metro Atlanta that shares a border with the City of East Point on the south and the City of Atlanta to the north. Figure 6 shows the relationships among five different kinds of infrastructure that comprise the context of this project:

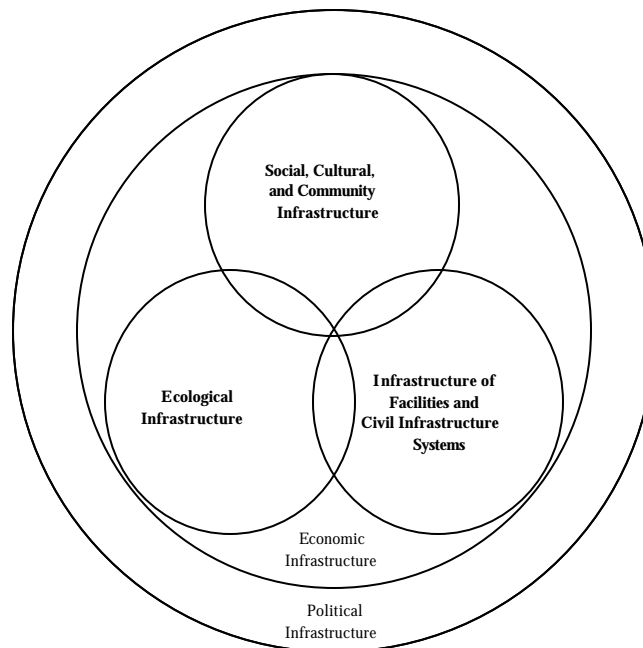


Figure 6: Five Infrastructures that Comprise the Context of a Project
(Vanegas & Pearce 1999)

- the *Social, Cultural, and Community Infrastructure* that will be created by the individuals and organizations who will occupy Building 170, the surrounding historic district, Fort McPherson as an installation, and metropolitan Atlanta as a whole
- the *Ecological Infrastructure* (i.e., water, soil, air, flora, and fauna) that comprises the natural environment in which Building 170 is located and that provides services required to construct and operate the building
- the *Technological Infrastructure: Facilities and Civil Infrastructure Systems* (i.e., systems for water supply, stormwater control, wastewater and solid waste disposal, transportation, energy, communication, etc.) that will provide the built environment to support the fundamental individual and community needs of the people who will work in Building 170
- the *Economic Infrastructure*, which provides the means of sustaining the previous three;
- the *Political, Legal, and Regulatory Infrastructure*, which can either sustain or destroy the previous four.

The following subsections describe each of these infrastructures in terms of the context of the Building 170 project.

Social, Cultural, and Community Infrastructure

The social, cultural, and community infrastructure of Building 170 includes individuals and organizations who will occupy Building 170, the surrounding historic district, Fort McPherson as an installation, the Army as a whole, the metropolitan Atlanta area, and the State of Georgia.

Building 170 Occupants – Building 170 will be occupied by two primary tenants: The Army Environmental Policy Institute (AEPI), who will occupy the south wing of the building, and a second as-yet undetermined tenant that will occupy the north wing of the building. Approximately 30 people employed by AEPI will occupy the building. From a cultural standpoint, AEPI is comprehensively a military organization and functions within the cultural norms of the Army, even though a majority of its staff are civilians. As a military organization, AEPI is responsive to command hierarchies and is especially interested in leading the military toward better environmental stewardship through both its policy-based initiatives and by example. Building 170 is expected to reflect AEPI's values of environmental stewardship and be the benchmark of sustainable historic adaptive reuse for the Army as a whole.

Fort McPherson Historic District – the 33 acre historic district at Fort McPherson consists of a corridor of forty historically significant buildings listed on the National Register of Historic Places, of which this project is one (www.mcpherson.army.mil). Active efforts are underway to make these buildings functional for modern purposes while preserving the overall historic fabric and significant features of the district. The primary contribution of the neighborhood is an overall architectural style, including the feature of walkability and close proximity of buildings in the district. There is a staff person (Beth Grashof) dedicated full time to ensuring that all activities in this district respect its historical character and comply with State Historic Preservation Office (SHPO) guidelines and U.S.

Department of Interior Guidance on Rehabilitation and Restoration of Historic Structures. The Garrison's Organizational Self Assessment (Phillips 1999) describes the Garrison's perspective on historic integrity as follows:

We are extremely sensitive to the preservation of our historic buildings. These structures are protected under both federal and state laws. A plan of proposed action for structural repair and façade maintenance is coordinated with the Georgia Environmental Preservation Society. In fact, that group recently congratulated us for the manner in which we protect our historic assets, holding us up as the benchmark for others. (p. 4)

Fort McPherson Installation – Fort McPherson has a long tradition with the Army, beginning in 1835 when it was no more than a meeting place and drill ground. It later became a training ground to prepare troops for the Civil War. In 1867, a 53 acre leased site was named McPherson Barracks. A new 10-company post was erected in 1885. Since then, Fort McPherson has grown into a 487 acre site that provides a mix of residential, commercial, and industrial activities and functions as a small city. Numerous service providers are located on post, including auto care, child care, a credit union, a fire department, housing, dining, a golf club, and other leisure activities (ibid.).

The installation as a whole provides the organizational and physical services necessary for the ongoing operation and functioning of the post and its tenants. The culture of this installation is strongly focused around service to customers, achieved by effective business operations comprised of six major service centers (Installation Support, Resource Management, Operations/Training, Community Activities, Public Safety, and Personnel Operations). Each of these service centers operates using Activity-Based Management (ABM), a progressive system for optimizing business function that is exemplary within the military as a whole (Phillips 1999). The Garrison leadership system is “based on a traditional military structure within a set of well-defined values, beliefs, standards, and cascading lines of authority” (ibid., p. 1). The Garrison Commander's operating theme is “Proudly serving tomorrow's Army, today” (ibid.). The cultural focus of the whole installation is on performing as a team of “customer-focused **service providers**, demanding performance excellence, and always seeking continuous improvement” (ibid., emphasis original). The Garrison Commander, while supporting traditional military culture, sees his function as the Chief Executive Officer (CEO) of a fundamentally business-driven organization which must operate cost effectively to provide competitive services in an overall government context of force reduction, diminishing operating budgets, and privatization. He has instituted a set of performance imperatives for the post, called the “Super Six”, which are:

- Most efficient operation (MEO)
- Best customer service possible
- Best business practices possible
- Counsel and train subordinates
- Post and work area appearance/de-clutter
- Get automated – reduce paper ASAP

From the standpoint of traditional operating practices of both the military and the federal government in general, these imperatives represent a cutting-edge approach to business-focused operation that is still unusual. This overall business philosophy has prompted the installation to apply for the Presidential Quality Award (Phillips 1999) in recognition of its outstanding operations.

The Army as a Whole – as the overall organizational structure of which both Fort McPherson and AEPI are a part, the Army culture pervades all aspects of this project. The culture of the Army is organized around seven primary Army values:

- **Loyalty** – Bear true faith and allegiance to the U.S. constitution, the Army, your unit, and other soldiers
- **Duty** – Fulfill your obligation
- **Respect** – Treat people as they should be treated
- **Selfless Service** – Put the welfare of the nation, the army, and your subordinates before your own
- **Honor** – Live up to all the Army Values
- **Integrity** – Do what's right legally and morally
- **Personal Courage** – Face fear, danger, or adversity

These values guide the behavior and culture of the Army and its staff, and explain the fundamental philosophy of the Army as an organization.

Metropolitan Atlanta –the Cities of East Point and Atlanta are direct neighbors of the post. The culture of the surrounding neighborhoods is typical of neighborhoods south of the central city of Atlanta. Commercial development in this area includes a variety of fast food establishments, discount food and retail centers, and other post-1960 commercial infill development. Residential development is primarily older housing with limited new development in selected areas. The overall metropolitan Atlanta area is characterized by unrestrained urban growth, particularly to the north of the city. While development to the north is typically perceived to be upscale development, the areas south of the city have largely been occupied by low- to middle-income families and until recently, have not been the focus of expanded development. As northern areas become developed to a point at which connectivity with the City of Atlanta is infeasible, increasing attention is being focused on areas south of the city as possible areas for development to meet the needs of the growing metropolitan area. The culture of metropolitan Atlanta, in contrast with much of the rest of the deep South, is a blend of culture from other regions and countries – Atlanta has more residents from other states and countries than it has native Georgians.

State of Georgia – Georgia has one of the most rapidly growing populations in the United States, due primarily to immigration from other states. A strong focus in the state is economic development. In the past, Georgia suffered from a perception of having poor education systems, infrastructure, and relatively low-tech development. With the growth in the metro Atlanta area, influx of high tech business, and continued growth in primary industries of poultry, wood products, and textiles, Georgia's economic development has

barely begun. Key attributes of the north Georgia culture include focus on growth and development, international affairs, and quality recreation.

Ecological Infrastructure

The ecological infrastructure of Building 170 includes the water, soil, air, flora, and fauna that comprises the natural environment in which the building and its supply and sink systems are located that provide services required to construct and operate the building. Fort McPherson is located in the Atlanta piedmont area of the southeastern United States, which is a primarily temperate climate.

Water – water issues have recently received serious attention in the metro Atlanta area over the past five to ten years. With almost exponential growth and development in the region, there is serious concern that supplies of water occurring naturally in the watershed will be overconsumed within the next thirty to thirty-five years. Atlanta relies primarily on the Chattahoochee river (i.e., surface water) for its urban water supply and dispersion of treated (and untreated) wastewater and stormwater. Communities downstream in south Georgia, Alabama, and Florida have expressed legitimate concerns about their water supply, given the growth in metro Atlanta. In addition to increases in water consumption, Atlanta has also experienced significant water quality problems during storm events due to its combined stormwater and wastewater sewer systems. Prompted in part by substantial fines due to violation of the Clean Water Act, Atlanta has been making progress toward the construction of Combined Sewer Overflow (CSO) treatment systems to mitigate this problem. Nonetheless, with dramatic increases in paved, impermeable surfaces, quantities of stormwater runoff will likely only increase over time, and may overwhelm present solutions to the problem. There is a strong interest (although sometimes barred by codes and regulations) in developing natural stormwater management and treatment systems, as well as in permeable pavement and other solutions to the stormwater and aquifer recharge problems.

Soil – From a soil standpoint, Atlanta is characterized by an abundance of Georgia red clay. Much of the City of Atlanta is located on supportive rock structures in the Piedmont region, although some areas have been subject to catastrophic subsidence due in part to aging stormwater systems and in part to limestone erosion. Soil quality in the region varies dramatically based on past uses of land. There are large areas in metro Atlanta with significantly contaminated soil due to industrial legacies. The immediate area around Building 170 is not expected to have any significant soil-related issues.

Air – Air quality is another serious problem in the metro Atlanta and north Georgia region. Metro Atlanta is ranks highest in the nation in terms of vehicle miles traveled (VMT) per capita per day. Not surprisingly, the abundance of new (sprawled) development in a culture of automobile-based travel has resulted in a serious air quality problem, with “serious” ongoing ground level ozone non-attainment problems that threatens the supply of Federal highway dollars to the state. Metro Atlanta is also primarily served by coal-fired and fossil fuel-based power generation, which substantially contributes to poor air quality in the region.

Flora and Fauna – the flora and fauna of the region is typical of urban and suburban development in temperate climates, and includes raccoons, gray squirrels, opossums, and

a variety of birds, insects, and plants. No significant threatened or endangered species are present in the Fort McPherson and neighboring areas. Another impact of development, however, has been a substantial reduction in tree cover throughout the metro area. Formerly known as a city of trees, Atlanta is presently losing over 500 acres per week of greenspace and over 27 acres of trees per day due to uncontrolled development (Creech 2000). A strong movement is in place to revegetate urban areas and preserve existing trees in Atlanta, primarily driven by the nonprofit, volunteer-based group Trees Atlanta.

Technological Infrastructure: Facilities and Civil Infrastructure Systems

The technological infrastructure of Building 170 provides services to support the fundamental individual and community needs of the people who will occupy the building. Specific systems include water supply, stormwater control, wastewater and solid waste disposal, transportation, energy, and communications. The Fort McPherson total set of physical assets also serve as a supporting infrastructure for this project.

Water Supply System – as mentioned in the previous section, water supply for metro Atlanta is primarily provided via surface water from the Chattahoochee river, supplemented by well systems that pull water directly from the aquifer. Atlanta has privatized its water supply system, which presently delivers million of gallons per day of treated water to the residents and businesses of Atlanta. Fort McPherson receives fresh water from both the City of Atlanta and the City of East Lake. Water supply enters the installation at three different points: two from the City of Atlanta at Campbellton Road (62 gpm capacity) and Lee Street (54 gpm capacity), and one from the City of East Lake at After Avenue (59 gpm capacity). The entire water distribution system on post was replaced in 1991-1992 with Schedule 80 PVC. Water supply systems within buildings range from copper piping in older buildings to PBT pipe in newer structures that has been widely replaced with copper supply lines.

Stormwater Control, Conveyance, and Treatment Systems – Unlike the surrounding communities who are connected to Atlanta's wastewater treatment system for both wastewater and stormwater, Fort McPherson has its own stormwater collection, conveyance, and use systems. In light of the recent drought in the North Georgia area, Fort McPherson has undertaken water conservation and displacement efforts, and presently uses stormwater collected on post to irrigate its golf course and the baseball field.

Wastewater Conveyance and Treatment System – All wastewater from the post is collected via corrugated PVC and concrete conveyance pipe and transported to City of Atlanta's Utoy Creek Treatment Plant.

Solid Waste Conveyance and Disposal System – All solid waste on post is collected and transported by private contractor (currently Waste Management, Inc.) to one of several area landfills (currently Live Oaks Landfill). The post also has an active recycling system provided by Reams Enterprises which accepts aluminum, office paper, newspaper, and plastic.

Transportation Systems – Fort McPherson is accessed primarily by car, and can be easily reached via Interstate 75/85 connecting through the Lakewood Freeway, or by surface streets connected to the post. Public transit is available and provided by the Metropolitan

Atlanta Rapid Transit Authority (MARTA). The Lakewood/Ft. McPherson train stop is located just outside the main gate, and a MARTA bus will take passengers from this stop to various locations across the installations. Building 170 is reachable from the MARTA station by walking, but it is a fairly lengthy walk of 1.5 to 2 miles. Sidewalks are available along the main access road, but no shelter and little shading is provided to encourage walking. Access around post is undertaken primarily by car or post vehicles.

Energy Systems – The primary source of energy at Fort McPherson is supplied via the grid by Georgia Power Company, an operating subsidiary of the Southern Company. Georgia Power has a generating capacity of over 14,000 megawatts, serves a customer base of 1.7 million people, and provides electric service in all but six of Georgia's 159 counties (<http://eerr.notes.org/georgia/structure.htm>). Grid supplied power in the metro Atlanta area is provided by a distribution of 74.3% coal, 22.4% nuclear, 2.7% hydroelectric, and 0.6% combustion turbines. Virtually no electrical power supplied by the grid in this region uses renewable or alternative energy sources. Additional post-supplied sources of power include natural gas and propane.

Communication Systems – The communications infrastructure on post is primarily traditional phone line and limited Local Area Networks (LANs) connected via a router to an internet backbone. Fort McPherson has its own main telephone switch, with service provided by BellSouth. The service comes on post via fiber and then goes to the main switch in Building 205. Other buildings are served by local nodes off the main switch. FORSCOM provides an internet service called ForceNet. There is a post intranet with at least two dozen domains. Internet services include firewalled email and world wide web services. The installation has a web presence at <http://www.mcpherson.army.mil>. Tenants on post are responsible for maintaining their own web presence and arranging for their own web servers but have the option to use FORSCOM's service).

Fort McPherson Other Physical Assets – Other physical assets of Fort McPherson and its associated facilities at Fort Gillem and Lake Allatoona include (Phillips 1999):

- 426 total buildings, with a total of 8,308,731 square feet
- 112 Family housing units
- 280 Barracks spaces
- 5 BEQ/BOQ facilities
- 72 Guest housing rooms
- 192 miles of paved roads
- 487 total acres of site

Economic Infrastructure

The economic infrastructure of Building 170 consists of two primary components: the economic infrastructure of the Army, and the economic infrastructure of the community and region in which the facility is located. The specific economic infrastructure of Fort McPherson is included as part of the Army's economic infrastructure.

Economic Infrastructure of the Army – The U.S. Army receives 25% of the total military budget in the United States (Army Posture Statement FY00). As part of the United States Army, Fort McPherson is the fifth largest employer in Atlanta (Atlanta Business Chronicle, March 1999). Its sub-post, Fort Gillem, is listed as the third largest employer in Clayton County (www.mcpherson.army.mil). Combined, these installations contribute almost \$500 million per year to the metropolitan Atlanta economy through military and civilian salaries, local contracts, tuition and education payments, and school impact funds (Phillips 1999). Counting military, civilian, and retired personnel and their families, Fort McPherson's economy supports a total population of approximately 121,000 people.

Funding for projects like Building 170 comes from a variety of potential sources. First, since the estimated cost of renovation for the building exceeds \$1 million, it is classified as a MILCON project which means that by law, it must be undertaken by the U.S. Army Corps of Engineers and be approved and programmed by overall Army facility management personnel. Portions of the project are being undertaken using Fort McPherson operations and maintenance dollars, including asbestos abatement, reroofing, and portions of demolition.

Since the building is intended to be a showcase of cutting edge technologies, AEPI intends to seek external partnerships or technology donations to help pay for certain features of the building. Partnerships with external entities such as Georgia Power, Peachtree Windows, the National Renewable Energy Laboratory, and other government/corporate enterprises have been suggested. The extent to which such partnerships will be feasible depends on the kinds of technologies recommended for the facility. At this point in time, AEPI has requested that economics not be a primary concern in the programming and design of the facility, since it believes it can raise funds to construct the facility from a variety of sources given its status as a showcase facility.

Economic Infrastructure of the Community and Region – The economic infrastructure of the metro Atlanta area is quite strong. Supporting technological infrastructures such as transportation, water, and wastewater are provided by the City of Atlanta and receive support from the tax base as well as user fees and Federal dollars. Substantial economic development in the region has ensured a continuously growing tax base.

Political Infrastructure

The political infrastructure of Building 170, as with its economic infrastructure, includes two primary components: the political infrastructure of the Army, and the political infrastructure of the community and region in which the facility is located.

Political Infrastructure of the Army – The political infrastructure of the Army has several key components. First, the regulatory environment in which the Army functions includes Congressional and Executive mandates; Federal, state, and local laws; and higher headquarters policies and procedures. Fort McPherson's stated goal is to ensure that "the performance objectives of our **service providers** are to exceed [those] standards. Our parameters within this regulatory environment are to never knowingly or willingly engage in any performance or conduct which is immoral, illegal, unethical or just isn't the right thing to do" (Phillips 1999, p. iv, emphasis original).

Second, to ensure its long term viability, the Army is particularly concerned with compliance with Congressional mandates to cut operational costs and reduce the size of the federal work force (Phillips 1999). One challenge acknowledged explicitly in Fort McPherson's 1999 organizational self assessment is expressed as follows:

In light of our ever-changing business environment of privatization, out-sourcing, changes in work force demographics and declining dollars, the Garrison leadership will be challenged to maintain its unique military culture. Our Garrison focus and priorities must always be centered on taking care of the soldier...providing a home away from war. (ibid., p. iv)

Finally, the Army has also begun to pay increasing attention in the last ten years to its role as an environmental steward at its installations and in its operations. This political shift has been prompted by the realization that a healthy and viable natural environment is key to achieving the Army's mission by ensuring that it can continue to train its forces without violating environmental regulations. The Army's mission is ultimately concerned with preserving and enhancing the quality of life of all Americans, and the quality of the natural environment is a significant component of this objective as well. This new perception has been greatly encouraged by the Federal administration of the past eight years; however, it is unclear what effects the recent change in administration will have on the environmental philosophy of federal entities.

Political Infrastructure of the Community and Region – In contrast with growing interest at the Federal level in the concepts of sustainable facilities, infrastructure, and operations, the political infrastructure of the metro Atlanta area and the state of Georgia is less attuned to environmental quality and sustainability requirements. Attention at these levels is more focused on compliance with national environmental regulations such as the Clean Air Act, Clean Water Act, and others. Regulatory agencies at the state and local level (e.g., building code enforcement) are generally conservative with respect to encouraging or even accepting innovative technology that achieves results but does not comply with local codes, regulations, or traditions. Some exceptions to this rule include the Georgia Pollution Prevention Assistance Division, which has strong programs to encourage pollution prevention and sustainability in building-related projects and which has already contributed to the Building 170 project in a number of ways. Other state agencies such as the GA Office of Planning and Budget are also beginning to consider sustainability as a viable objective for activities in the state. However, relatively little progress has been made in this area at the local level to date.

Characterization of Initial Findings and Point of Departure

Based on the review of existing project and context data described in this chapter, the following subsections describe how the findings from this data can be characterized and formulated into a point of departure for the study described in subsequent chapters.

Initial Articulation of Stakeholder Requirements, Constraints, and Sustainability Goals

From previous documentation on the project and the outcome of the Sustainable Design Workshop conducted by Southface, the following requirements, constraints, and goals were articulated on behalf of project stakeholders:

- Compliance with EO 13101 and EO 13123
- Physical demonstration of sustainable design principles on a historic renovation/adaptive reuse project
- Creation of an ongoing “green briefing” for Army policy makers and base facilities personnel
- Reduction/minimization of environmental impact of the project
- Improvement of quality of life of building occupants
- Reduction in operating costs of the facility
- Preservation/enhancement of historic features/quality of the building
- Creation of an effective (and accessible) educational tool
- Demonstration of sustainable design *methods* on renovation plans for a historic building
- Provision of a quality work environment for AEPI
- Maximize pollution prevention
- Harvest and clean all on-site stormwater
- Eliminate heat island effect of buildings
- Generate no light pollution
- Offset building-created carbon dioxide with new vegetation
- Offset transportation-created carbon dioxide with new vegetation
- Create a pedestrian-friendly site
- Obtain all needed water from the site
- Clean all building wastewater on the site
- Reuse all of the existing building and materials
- Obtain all new materials from local resources
- Generate no waste on site (all waste reused or recycled)
- Use only healthy and environmentally benign materials
- Create a maintenance-free (“self-healing”) building
- Use no external power sources
- Use only renewable energy sources
- Generate no toxic emissions
- Create more energy than is used
- HVAC systems use no energy and require no maintenance

- All lighting provided by daylight
- No indoor health contaminants
- Total individualized comfort (thermal, light, noise)

The goals in this list range from traditional to aggressive, and some may even overlap or result in conflicting impacts. The challenge for this project is to reconcile and prioritize possible objectives for the building in such a way that the project can be realized and success can be measured. The listed goals, articulated in previous studies, provide a starting point for the present study. Additional work on establishing and aligning project goals is part of the stakeholder analysis performed in the next part of this study, and is described in subsequent chapters of the report.

Other Project Constraints and Assumptions

This project is unique for the Army in that it represents an experiment in how to develop a building project that is sustainable without compromising other project goals. The eventual design solution for this project must meet stakeholder requirements, constraints, and sustainability-related goals while remaining acceptable in terms of infrastructure interfaces, the culture of the Army, and the specific goals and objectives of Fort McPherson. The design solution must also respect the integrity of the historic qualities of the building and the historical district in which it is located.

While AEPI has not specifically articulated any cost-related constraints for the project, this research assumes that the technologies and strategies eventually selected for use in this building will pose only reasonable costs to the Army for construction. Any exceptional costs for use of non-commercialized technologies will be covered by external partners.

Point of Departure with Respect to Stakeholder Requirements, Constraints, and Sustainability-Related Goals

A summary of the overall project goals is provided by the results of the Sustainable Design Workshop conducted by Southface (Southface 2000b):

- To preserve and enhance the building's historic qualities
- To provide a quality work environment for AEPI
- To create an accessible educational tool to promote sustainable building technology
- To minimize the building's environmental impact

Many of the specific objectives in this document go beyond these general guidelines. However, these four objectives provide a point of departure for this study.

Tab 4

Overall Data Collection Tools and Frameworks

Fort McPherson Building 170

Baseline Stakeholder Survey

Section 1: Overall Project Objectives

Please list your top 3 objectives for the Building 170 renovation project that must be met in order for the project to be considered a “success”, in your opinion.

1. _____

2. _____

3. _____

Section 2: Specific Project Objectives

2.1 Embodied Environmental Values

How important, in your opinion, is it to have Building 170 exemplify the environmental values of the organization you represent? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please rate the importance of the following environmental values, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Preservation of natural ecosystems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resource efficiency/waste elimination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Preservation of biodiversity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water conservation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy conservation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving quality of human life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Equitably meeting human needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:_____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:_____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.2 Executive Order Compliance

How important, in your opinion, is Executive Order compliance for the Building 170 project? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not	Of Little	Somewhat	Important	Extremely
Important	Importance	Important		Important

Which of the following EOs are important to you regarding the Building 170 renovation? Select as many as necessary.

- ☐ EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- ☐ EO 13123: Greening the Government Through Efficient Energy Management
- ☐ EO 13148: Greening the Government Leadership in Environmental Management
- ☐ Other (please specify) _____
- ☐ None

Why is compliance with these EOs important or not important?

2.3 Sustainable Construction Practices

How important, in your opinion, is it for the Building 170 project to become a premier example of sustainable construction practices? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please list any measures that should be taken, in your opinion, to ensure that Building 170 becomes a premier example of sustainable construction practices:

2.4 Demonstration of Cutting Edge Technologies

How important, in your opinion, is it to demonstrate the use of innovative, cutting edge technologies in the Building 170 project? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please rate the importance of demonstrating cutting edge technologies in the following categories, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Site and landscape technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water-related technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Cutting edge building materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technologies for indoor environmental quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waste treatment technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list any specific technologies that should be considered for use in the Building 170 project, in your opinion:

Please list your top 3 concerns associated with demonstrating cutting edge technologies in this project:

- ---
- ---
- ---

2.5 *Capture and Documentation of Lessons Learned*

How important is it, in your opinion, to capture and document “lessons learned” from the Building 170 renovation? Please rate on the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please rate the relative importance of the following kinds of lessons:

	Not Important	Somewhat Important	Extremely Important
Project Barriers/Challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methods for Overcoming Barriers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project Successes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.6 Traffic Congestion

How important is it, in your opinion, to minimize traffic congestion with respect to Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

To what extent do you believe that undesirable increases in traffic congestion are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase

Please list any specific measures that, in your opinion, should be used to manage or mitigate the traffic impacts of this project:

2.7 Air Quality

How important is it, in your opinion, to minimize the contribution of Building 170 to poor air quality? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

To what extent do you believe that negative impacts to air quality are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase

Please list any specific measures that, in your opinion, should be used to manage or mitigate the air quality impacts of this project:

2.8 Water Quality and Supply

How important is it, in your opinion, to maximize the contribution of Building 170 to good water quality and to ensuring that sufficient quantities are available, to the greatest extent possible? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

To what extent do you believe that undesirable effects on water quality and/or supply are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase

Please list any specific measures that, in your opinion, should be used to manage or mitigate the water quality and supply impacts of this project:

2.9 *Urban Sprawl*

How important is it, in your opinion, for Fort McPherson to address urban sprawl efforts in the metro Atlanta area through its efforts with Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

To what extent do you believe that urban sprawl is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase

Please list any specific measures that, in your opinion, should be used to manage or mitigate the urban sprawl impacts of this project:

2.10 *Economic Development*

How important is it, in your opinion, for Building 170 to contribute to economic development in the East Point and metro Atlanta areas? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

To what extent do you believe that economic development is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase

Please list any specific measures that, in your opinion, should be used to increase the positive economic development impacts of this project:

2.11 Control of Project First Cost

How important is it, in your opinion, to minimize the initial project cost of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please list the top 3 aspects of the project that are most likely to affect the initial cost of the project, in your opinion:

- ---

- ---

- ---

2.12 Control of Life Cycle Costs

How important is it, in your opinion, to optimize the life cycle cost of Building 170? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please list the top 3 aspects of the project that are worth additional initial investment to control life cycle costs, in your opinion:

- _____

- _____

- _____

2.13 Historical Preservation

How important is it, in your opinion, to restore Building 170 (a historic structure) according to Federal and State historic preservation guidelines? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important

Please list the top 3 features of the building that are most important to preserve, in your opinion:

- _____

- _____

- _____

2.14 *High Quality, Productive Workplace*

How important is it, in your opinion, to renovate Building 170 into a high quality and productive work environment? Please rate using the following scale (*circle your response*).

1	2	3	4	5
Not	Of Little	Somewhat	Important	Extremely
Important	Importance	Important		Important

Please list the top 3 features of the project that are most important for a high quality and productive workplace, in your opinion:

- _____

- _____

- _____

Section 3: *Background Information*

3.1 *Project Involvement*

What roles do/will you play in the Building 170 project? Please describe how you are presently involved with Building 170, or how you will be involved in the future:

3.2 *Organizational Affiliation*

With which company, organization, or division are you affiliated?

3.3 *Other Comments*

Is there anything else you would like to say about the Building 170 project, site, or context that we have not addressed in this survey?

Whole Building Functionality and Serviceability

ASTM Subcommittee E06.25 on Whole Buildings and Facilities

- E 1679-95: Practice for Setting the Requirements for the Serviceability of a Building or Building-Related Facility
- E 1334-95: Practice for Rating the Serviceability of a Building or Building-Related Facility

Aspects of Serviceability - Classification for Serviceability of an Office Facility for:

- E 1660-95a: Support for Office Work
- E 1661-95a: Meetings and Group Effectiveness
- E 1662-95a Sound and Visual Environment
- E 1663-95a Typical Office Information Technology
- E 1692-95a Change and Churn by Occupants
- E 1664-95a Layout and Building Factors
- E 1693-95 Protection of Occupant Assets
- E 1665-95a Facility Protection
- E 1666-95a Work Outside Normal Hours or Conditions
- E 1667-95a Image to the Public or Occupants
- E 1668-95a Amenities to Attract and Retain Staff
- E 1694-95a Special Facilities and Technologies
- E 1669-95a Location, Access, and Wayfinding
- E 1700-95 Structure and Building Envelope
- E 1701-95 Manageability
- E 1670-95a Management of Operations and Maintenance
- E 1671-95a Cleanliness

E 1660-95a: Support for Office Work**A.1.1 Photocopying**

- Power supply
- Small table-top copiers
- Convenience copiers
- Large copiers

A.1.2 Training rooms, general

- Mix, quantity, future capability
- Environment
- Acoustic control
- Fixtures and fixed equipment
- Breakout/syndicate rooms
- Floorplate and access

A.1.3 Training rooms for computer skills

- Quantity, location, future capability
- Environment
- Acoustic control
- Fixtures and fixed equipment
- Information technology
- Floorplate and access

A.1.4 Interview rooms

- Present and potential quantity of interview rooms
- Ventilation
- Enclosure and speech privacy
- Access and physical protection

A.1.5 Storage and floor loading

- Floor load capacity ON office floor
- Storage OFF office floors, including in basement
- Access to storage OFF office floors, including basement
- Goods handling to and in storage OFF office floors

A.1.6 Shipping and receiving

- Loading dock
- Truck loading capacity
- Holding area at loading dock
- Elevator access
- Couriers

E 1661-95a: Meetings and Group Effectiveness**A.2.1 Meeting and conference rooms**

- Mix, quantity
- Floorplate and access
- Acoustic control
- Environment
- Fixtures and fixed equipment

A.2.2 Informal meetings and interaction

- Internal circulation node(s)
- Entrance node(s)
- Pause area(s)
- Food and public facilities

A.2.3 Group layout and territory

- Layout for efficient group work
- Layout for various group sizes
- Environmental control
- Separation
- Legibility of boundaries and territory

A.2.4 Group workrooms

- Group or project workroom(s)
- Acoustic separation for information security
- Environment
- Fixtures and fixed equipment
- Access from individual workstations

E 1662-95a Sound and Visual Environment**A.3.1 Privacy and speech intelligibility**

- Confidentiality
- Background sound for speech privacy
- Speech intelligibility

A.3.2 Distraction and disturbance

- Office noise
- Background sound as a means of masking distracting noise
- External noise
- Distracting conversations
- Reflected sound
- Movement of people

A.3.3 Vibration

- Movement due to people or equipment
- Vibration from machines or vehicles

A.3.4 Lighting and glare

- Illumination level
- Visual defects
- Glare

A.3.5 Adjustment of lighting by occupants

- Control of ceiling lights
- Relocation of ceiling lights
- Window coverings
- Power for task lights

A.3.6 Distant and outside views

- Relaxation of eyes
- View to outside

E 1663-95a Typical Office Information Technology**A.5.1 Office computers and related equipment**

- Zones for high density of equipment
- HVAC services
- Illumination
- Acoustic control

A.5.2 Power at workplace

- Power distribution
- Plug-in points per workplace
- Uninterruptible power supply (UPS)

A.5.3 Building power

- Present capacity
- Potential increase
- Reliability and quality of supply

A.5.4 Data and telephone systems

- Distribution
- Future capacity
- Shielding of data cables
- Local area network
- Rooms for data and telephone connections

A.5.5 Cable plant

- Unshielded twisted pair
- Distance to cable connection rooms
- Coaxial cable
- Fiber optic cable

A.5.6 Cooling

- Increased capacity

E 1692-95a Change and Churn by Occupants**A.6.1 Disruption due to physical change**

- Disruption during relocation
- Disruption to neighboring occupants

A.6.2 Illumination, HVAC, and sprinklers

- Relocating light fixtures
- Relocating air diffusers
- Special air exhaust
- Relocating sprinkler heads
- Universal footprint geometry

A.6.3 Minor changes to layout

- Changes in workplace layouts
- Consequences of minor changes

A.6.4 Partition wall relocations

- Floor to ceiling partition walls
- Extent of salvage

A.6.5 Lead time for facilities group

- Planning major realignment
- Ordering and installation

E 1664-95a Layout and Building Factors

- A.7.1 Influence of HVAC on layout
 - Type of layout
 - Location of rooms
 - Screens & furniture
 - Population density
 - Upgrade
- A.7.2 Influence of sound and visual features on layout
 - Main aisles
 - Location of workstations
 - VDU locations
 - Type of layout
 - Upgrade
- A.7.3 Influence of building loss features on space needs
 - Usable area lost

E 1693-95 Protection of Occupant Assets**A.8.1 Control of access from building public zone to occupant reception zone**

- Staffing of entry control station
- Control of elevators
- TV monitoring
- Control of deliveries
- Entry to reception zone

A.8.2 Interior zones of security

- Operational zone
- Secure zone

A.8.3 Vaults and secure rooms

- Location
- Floor loads
- Wall construction
- Doors and hardware
- Ventilation
- Alarms

A.8.4 Security of cleaning service systems

- Staff security
- Monitoring

A.8.5 Security of maintenance service systems

- Staff security
- Monitoring

A.8.6 Security of renovations outside active hours

- Contractor's staff
- Control of admission
- Temporary enclosure

A.8.7 Systems for secure garbage

- Storage containers
- Location of storage
- Separated waste

A.8.8 Security of key and card control systems

- Occupant keying system
- Key identification
- Key distribution

E 1665-95a Facility Protection**A.9.1 Protection around building**

- Electronic or acoustic intrusion
- Overview of site
- Information on activities in neighboring buildings
- Personal safety

A.9.2 Protection from unauthorized access to site and parking

- Perimeter control
- Easements
- Permission for access to site
- Control of access
- Security of stored vehicles

A.9.3 Protective surveillance of site

- Illumination of site
- Monitoring of site
- Patrol of site
- Placement of planting material
- Selection of planting material
- Berms and walls

A.9.4 Perimeter of building

- Entry from adjacent building(s)
- Access to roof from adjacent building(s)
- Access to building
- Doors and windows secure
- Air intake location
- Alarms, monitors, and guards

A.9.5 Public zone of building

- Entry security desk
- Separation of public and occupant zones
- Support for crowd control
- Public toilets

A.9.6 Facility protection services

- Locking
- Access doors
- Alarms
- External communication routing
- Communications redundancy

E 1666-95a Work Outside Normal Hours or Conditions**A.10.1 Operation outside normal hours**

- Operating building
- Lead time to change operating hours or conditions

A.10.2 Support after-hours

- Food
- Access to storage
- Added physical protection

A.10.3 Temporary loss of external services

- Disruption to occupants
- Continued occupant operations
- Standby during loss of external power
- Alternative telecommunication services

A.10.4 Continuity of work (during breakdowns)

- Work during breakdown
- Frequency of breakdowns
- Duration of breakdowns
- Loss of productivity

E 1667-95a Image to the Public or Occupants

A.11.1 Exterior appearance

- Overall appearance of building, aesthetics
- Condition of exterior surfaces
- Approaches and entrance

A.11.2 Public lobby of building

- General appearance
- Materials and condition
- Layout and spaciousness
- Interior signage
- Staffed information desk

A.11.3 Public spaces within building

- Image of public areas
- Public circulation routes
- Washrooms accessible to the public

A.11.4 Appearance and spaciousness of office spaces

- Appearance
- Sense of spaciousness

A.11.5 Finishes and materials in office spaces

- Finishes
- Window coverings
- Hardware and fixtures

A.11.6 Identity outside building

- Identity of building
- Corporate identity and signage
- Quality of external signs

A.11.7 Neighborhood and site

- Image of neighborhood
- Organizations and activities in the locality
- Site condition and landscaping
- Organizations and activities in the building

- Compatibility with offices of units of the organization

E 1668-95a Amenities to Attract and Retain Staff**A.12.1 Food**

- On-site service
- Potential for on-site service
- Neighborhood facilities

A.12.2 Shops

- Existing shops
- Potential for shops in building
- Neighborhood shopping

A.12.3 Day care

- Existing day care on-site
- Neighborhood facility

A.12.4 Exercise room

- Existing exercise facilities
- Potential for exercise facilities

A.12.5 Bicycle racks for staff

- Existing bicycle racks
- Potential for additional bicycle racks
- Risk of theft

A.12.6 Seating away from work areas

- Existing seating
- Potential for seating
- Separate ventilation for smoking areas

E 1694-95a Special Facilities and Technologies**A.13.1 Group or shared conference center**

- Present provision
- Potential space
- Potential services

A.13.2 Video teleconference facilities

- Present provision
- Potential Space
- Potential services

A.13.3 Simultaneous translation

- Present provision
- Potential for translator facilities

A.13.4 Satellite and microwave links

- Present provision
- Potential for installation

A.13.5 Mainframe computer center

- Present provision
- Potential for installation

A.13.6 Telecommunications center

- Present provision
- Potential for installation

E 1669-95a Location, Access, and Wayfinding

A.14.1 Public transportation (urban sites)

- Staff commuting during peak hours
- Distance to transit stops
- Visitors use of public transportation during off-peak hours

A.14.2 Staff visits to other offices

- Location of other offices visited during work
- Convenience of access to other sites

A.14.3 Vehicular entry and parking

- Separation of pedestrians and vehicles
- Separation of cars and trucks
- Parking at urban site
- Parking at small town or suburban site

A.14.4 Wayfinding to building and lobby

- Locating the building
- Wayfinding to entry
- Visitor drop-off
- Wayfinding to lobby

A.14.5 Capacity of internal movement systems

- Visitor traffic in elevators
- Capability to provide for staff traffic in elevators
- Elevators, escalators, and stairs
- One and two-story buildings

A.14.6 Public circulation and wayfinding in building

- Separation of incompatible groups
- Wayfinding to elevators or stairs
- Wayfinding within building
- Separation of freight and passengers

E 1700-95 Structure and Building Envelope**B.1.1 Typical office floors**

- Information on allowable loading
- Floor load capacity
- Levelness and evenness

B.1.2 External walls and projections

- Permanence of exterior finishes
- Water penetration
- Signs of deterioration
- Exterior projections

B.1.3 External windows and doors

- Weathertightness
- Sealants
- Defects

B.1.4 Roof

- Leaks
- Flashings
- Condition

B.1.5 Basement

- Settling
- Cracking
- Moisture penetration
- Condition of concrete

B.1.6 Grounds

- Paving
- Landscaping
- Site drainage
- Site or street furniture

E 1701-95 Manageability**B.2.1 Reliability of external supply**

- Electrical power supply
- Building services (except power)
- Telecommunications
- Gas supply
- Water supply system
- Sewage or drainage system
- Heating, ventilating, and air conditioning system
- Elevators and escalators

B.2.2 Anticipated remaining service life

- Building envelope: seals, joints
- Roofing and flashing
- HVAC prime movers and main systems
- HVAC secondary distribution systems
- HVAC controls
- Elevators and escalators
- Ceiling systems, including fixtures
- Interior finishes
- Operable items, e.g., doors and windows
- Other systems, e.g., plumbing
- Site, e.g., paving, sidewalks, etc.
- Electrical system
- Life safety system

B.2.3 Ease of operation

- Storeroom
- Space for building operation personnel
- Operating instructions for services and equipment

B.2.4 Ease of maintenance

- Storeroom for maintenance
- Maintenance workshop

- Maintenance contractors
- Availability of replacement parts
- Data for maintenance
- Painting and repairs
- B.2.5 Ease of cleaning
 - Types of surfaces and materials
 - Fixtures, furniture, etc.
 - Condition
 - Accessibility
 - Waste handling
 - Recycling
- B.2.6 Janitorial facilities
 - Supplies store
 - Closets on each floor
 - Parking and facilities
- B.2.7 Energy consumption
 - Building envelope and systems
 - Effects
- B.2.8 Energy management and controls
 - Occupant participation in energy conservation program
 - Automatic response to user control
 - Flushing program adjusted in extreme weather conditions
 - Computerized direct digital control of building systems
 - Only monitoring and control are computerized
 - Only time clocks (automatic shutdown)
 - Heat recovery or heat pump system
 - Night setback
 - Renewable energy source
 - On-site or district power generation or cogeneration
 - Energy use data collected and targets are set and met

E 1670-95a Management of Operations and Maintenance**B.3.1 Strategy and program for operations and maintenance**

- Strategy and program
- Adequacy of budget
- Human resources
- Availability of replacement parts
- Maintenance contractors

B.3.2 Competencies of in-house staff

- Training
- Cross-trade qualification
- Electrical systems
- Electronic systems and controls
- HVAC equipment
- Piping systems and repair
- Minor carpentry

B.3.3 Occupant satisfaction

- Actions to achieve confidence of occupant staff
- Actions to achieve confidence of senior management
- Response to surveys
- Outsourcing

B.3.4 Information on unit costs and consumption

- Database on O&M operations
- Comparison with recognized external standards and practices
- Knowledge of building operational parameters and their associated costs
- Use of information for effective O&M operations

E 1671-95a Cleanliness**B.4.1 Exterior and public areas**

- Site
- Building
- Interior public spaces
- Fittings, fixtures, and furniture

B.4.2 Office areas (interior)

- Building surfaces
- Fittings, fixtures, and furniture

B.4.3 Toilets and washrooms

- Toilets and washrooms (cleanliness)
- Other amenities

B.4.4 Special cleaning

- Food facilities
- Computer center
- Secure area

B.4.5 Waste disposal for building

- Office waste
- Kitchen waste
- Garbage compactor
- Recycling program

Tab 5

Garrison Stakeholder Protocols and Data

Fort McPherson Building 170
Baseline Stakeholder Survey
Garrison Level Compiled Results

Section 1: Overall Project Objectives

Please list your top 3 objectives for the Building 170 renovation project that must be met in order for the project to be considered a “success”, in your opinion.

- Complete and usable facility
- Equipment installed that will last especially in regard to HVAC - Mechanical and Electrical
- Landscaping surrounding that is in coordination with what USACE is accomplishing in B171
- The reuse of a vacant historic building.
- The innovative adaptive use of the building, whose design follows the Secretary of the Interior’s Standards for rehabilitation.
- Showcase that “green architecture” and historic preservation are compatible objectives – historic preservation IS “green.”
- Restoration of interior and exterior architectural characteristics
- Customer satisfaction/comfort
- Installation of efficient “State of the Art” utilities systems
- Energy conservation measures and affirmative procurement utilized to maximum extent.
- Documented project process with sustainable design/development – future design guidance
- Compliance with Executive Orders 13123, 13101, 13148

Section 2: Specific Project Objectives

2.1 Embodied Environmental Values

How important, in your opinion, is it to have Building 170 exemplify the environmental values of the organization you represent? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			2	2

Please rate the importance of the following environmental values, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Preservation of natural ecosystems	1	2	1
Resource efficiency/waste elimination		2	2
Preservation of biodiversity	2	1	1
Water conservation		2	2
Energy conservation		1	3
Improving quality of human life		1	3
Equitably meeting human needs		1	3
Other: Historic preservation			1
Other: _____			

2.2 Executive Order Compliance

How important, in your opinion, is Executive Order compliance for the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			2	2

Which of the following EOs are important to you regarding the Building 170 renovation? Select as many as necessary.

- 3 EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- 4 EO 13123: Greening the Government Through Efficient Energy Management
- 3 EO 13148: Greening the Government Leadership in Environmental Management

Other (please specify):

1 EO 11593: Protection and Enhancement of the Cultural Environment

0 None

Why is compliance with these EOs important or not important?

- They are general, macro goals of the office of the President and the United States government. They provide a basis for sound leadership.
- Future funding needs.

2.3 Sustainable Construction Practices

How important, in your opinion, is it for the Building 170 project to become a premier example of sustainable construction practices? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		1	2	1

Please list any measures that should be taken, in your opinion, to ensure that Building 170 becomes a premier example of sustainable construction practices:

- Remove all interior/exterior mechanical/electrical/plumbing completely and start again
- Reuse of existing building materials; reasonable, cost-effective methods/techniques; practical ideas as well as “cutting-edge.”
- Documented process showing measures taken to ensure affirmative procurement and consideration of all practicable sustainable construction practices.

2.4 Demonstration of Cutting Edge Technologies

How important, in your opinion, is it to demonstrate the use of innovative, cutting edge technologies in the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			3	1

Please rate the importance of demonstrating cutting edge technologies in the following categories, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Site and landscape technologies		1	3
Energy technologies			4
Water-related technologies		1	3
Cutting edge building materials		3	1
Technologies for indoor environmental quality			4
Waste treatment technologies	1	2	1

Please list any specific technologies that should be considered for use in the Building 170 project, in your opinion:

- Solar heat diurnal ice cooling
- Lighting control devices
- HVAC systems
- Passive systems
- Water/energy conservation measures
- Solar technology
- Geothermal

Please list your top 3 concerns associated with demonstrating cutting edge technologies in this project:

- Longevity and availability of repair parts
- Loss of too much historic fabric and character defining features
- Keeping the project within budget
- Maintaining and restoration of architectural features/appearance
- Ease of operation and maintenance
- All technologies are demonstrated to be “the right fit” for the application
- Technologies are easily maintainable

2.5 Capture and Documentation of Lessons Learned

How important is it, in your opinion, to capture and document “lessons learned” from the Building 170 renovation? Please rate on the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		1	1	2

Please rate the relative importance of the following kinds of lessons:

	Not Important	Somewhat Important	Extremely Important
Project Barriers/Challenges		1	3
Methods for Overcoming Barriers			4
Project Successes			4
Other: document and implement practice in future projects			1

2.6 Traffic Congestion

How important is it, in your opinion, to minimize traffic congestion with respect to Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	1	1	2	

To what extent do you believe that undesirable increases in traffic congestion are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
	1	3		

Please list any specific measures that, in your opinion, should be used to manage or mitigate the traffic impacts of this project:

- Remove pavements and control access to western side of building
- Don't think it will be of little effect

2.7 Air Quality

How important is it, in your opinion, to minimize the contribution of Building 170 to poor air quality? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	1	1		2

To what extent do you believe that negative impacts to air quality are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
1	2			

Please list any specific measures that, in your opinion, should be used to manage or mitigate the air quality impacts of this project:

<None listed>

2.8 Water Quality and Supply

How important is it, in your opinion, to maximize the contribution of Building 170 to good water quality and to ensuring that sufficient quantities are available, to the greatest extent possible? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		1	2	1

To what extent do you believe that undesirable effects on water quality and/or supply are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
1	3			

Please list any specific measures that, in your opinion, should be used to manage or mitigate the water quality and supply impacts of this project:

- Use of stormwater for irrigation needs to be considered
- Use of water efficient fixtures to maximum extent

2.9 Urban Sprawl

How important is it, in your opinion, for Fort McPherson to address urban sprawl efforts in the metro Atlanta area through its efforts with Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	3	1		

To what extent do you believe that urban sprawl is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
2	1			

* One respondent circled both “no perceived increase” and “little increase”

Please list any specific measures that, in your opinion, should be used to manage or mitigate the urban sprawl impacts of this project:

<None listed>

2.10 Economic Development

How important is it, in your opinion, for Building 170 to contribute to economic development in the East Point and metro Atlanta areas? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	3	1		

To what extent do you believe that economic development is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
2	2			

Please list any specific measures that, in your opinion, should be used to increase the positive economic development impacts of this project:

- Utilize local contractors where applicable

2.11 Control of Project First Cost

How important is it, in your opinion, to minimize the initial project cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		2	2	

Please list the top 3 aspects of the project that are most likely to affect the initial cost of the project, in your opinion:

- A&E fees
- Sound mechanical engineering
- Interior finishes
- Heating and Cooling interior, utilities systems used to achieve
- Restoration of Windows to operating condition
- Restoration of exterior masonry
- Unknown parameters for use of innovative technologies

2.12 *Control of Life Cycle Costs*

How important is it, in your opinion, to optimize the life cycle cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			2	2

Please list the top 3 aspects of the project that are worth additional initial investment to control life cycle costs, in your opinion:

- Demonstrated quality products in lieu of unproven proto types
- Interior and Exterior Lighting
- Heating Ventilation and Air Conditioning Systems
- Insulation of exterior surfaces

2.13 *Historical Preservation*

How important is it, in your opinion, to restore Building 170 (a historic structure) according to Federal and State historic preservation guidelines? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			1	3

Please list the top 3 features of the building that are most important to preserve, in your opinion:

- Original structure exterior with cutting edge interior

- Windows
- Exterior appearance
- Semblance of original interior floor plan and architectural features
- Exterior Architectural features (Masonry, Wood Details, etc.)
- Restoration of Windows
- Restoration of interior ceilings, transoms, details
- Preservation of façade
- Interior structures

2.14 High Quality, Productive Workplace

How important is it, in your opinion, to renovate Building 170 into a high quality and productive work environment? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			1	3

Please list the top 3 features of the project that are most important for a high quality and productive workplace, in your opinion:

- Already have
- Attractive looking space
- Environmental controls, i.e., comfortable in terms of heating in winter and cooling in summer
- Adequate lighting, especially natural light
- Light and Bright interiors
- Efficient Heating and cooling with some limited customer control
- Restoration of windows to operating condition
- Consistent and high air quality
- Good lighting
- Adequate and properly designed/function working areas.

Section 3: Background Information

3.1 Project Involvement

What roles do/will you play in the Building 170 project? Please describe how you are presently involved with Building 170, or how you will be involved in the future:

- Chief Facilities Maintenance Ft McPherson and Ft Gillem
- I will be involved with historic preservation issues, making sure the project follows the Secretary of the Interior's Standards for Historic Preservation as required by AR 220-4. I will be providing design guidance in terms of historic preservation, reviewing design drawings, and preparing the necessary Section 106 documentation package for review by the SHPO IAW the Natural Historic Preservation Act.
- Project Manager, Engineer, Architect
- Energy conservation; environmental considerations

3.2 Organizational Affiliation

With which company, organization, or division are you affiliated?

- Operations and Maintenance
- Cultural Resources Manager for Fort McPherson
- Garrison Directorate of Installation Support, Engineer plans and services
- DIS – Environmental Division

3.3 Other Comments

Is there anything else you would like to say about the Building 170 project, site, or context that we have not addressed in this survey?

- Low bids do not generate complete and usable facilities
- Once again, extremely important that the process be a focused and documented approach. Needs to be a single facilitator to keep process intact and running smoothly in the right direction.

Fort McPherson Building 170

Stakeholder Group Interview Guide

Fort McPherson Garrison Personnel

Note: This guide serves as an agenda and checklist for facilitation of a two-hour group interview session. Approximate times are provided as an aid to organization of the session.

Agenda

1:30 PM – 1:45 PM	Part A: Welcome and Introductions
1:45 PM – 2:00 PM	Part B: Project Status
2:00 PM – 2:20 PM	Part C: Project Resources and Constraints
2:40 PM – 3:00 PM	Part D: Project Team
3:00 PM – 3:15 PM	Part E: Project Objectives
3:15 PM – 3:30 PM	Part F: Project Details
3:30 PM - ??	Building 170 Walkthrough and Documentation Review

Part A: Welcome and Introductions (1:30 PM – 1:45 PM)

Thank you for taking time from your busy schedule to participate in this meeting!

Introduction of **Georgia Tech Project Team**:

- Sheila Bosch – Facilitator
- Annie Pearce – Rapporteur (will be taking notes as we go)
- Corey Fischer – Timekeeper and Flip Chart Master (will keep us on track and document on flip charts what we discuss)
- Carl Leneis – Videographer (will be documenting the session)

Session documentation will be conducted in three ways:

- Via transcript (Annie will be transcribing as we go)
- Via video (Carl will create a video of the session for later review to double-check the transcript)

- Via flip charts (Corey will summarize what we discuss on flip charts so you can double-check what we talk about as we go along)

Does anyone have a problem with being videotaped as part of this session? (Hopefully not – reassure them that the reason for video is as a backup to validate the transcript. We should also try to find out if they have any problems with being personally identified, since we can keep the transcripts anonymous if necessary).

Background to the project/Reason for this meeting:

As you all are aware, Building 170 is rapidly becoming the most researched building in all of the Army's inventory ;-). Many of you participated in the Sustainable Design Workshop this summer to generate ideas for the building's renovation, and there were a lot of good ideas that came out of that meeting.

Since then, Georgia Tech has been asked by the Army Environmental Policy Institute to take another look at the design ideas that resulted from that meeting, and to see if any improvements could be made to further increase the sustainability of the project. One of our tasks is to talk with different stakeholders for the project and document their objectives and constraints related to the project. That's why we're having this meeting today. You are one of five groups of people we'll be talking to, and we hope to get some ideas from you about who needs to be included in the other groups as well.

Here's how the session is going to work. Please have a look at the agenda for the meeting today (refer to flip chart). We're going to start by talking about your roles and responsibilities in the project, followed by a discussion of your responses to the questionnaire you all received last week. I hope you all brought your questionnaires with you. If not, we'll collect them from you after the session today.

After we go over the questionnaire, we'll take a short stretch break and then talk about specific resources and constraints that will be available for the building over its life cycle. We'll take about 15 minutes to talk about other members of the project team, and finish out the session by asking you about some of the details of the project that have come up during the document review. Afterwards, we'll collect your questionnaires and any other information you recommend to us.

Any questions?

Before we get started, there are a few **rules for today's session:**

- Only one person should talk at a time

- Please make an effort to speak loud enough so that everyone can hear you
- Feel free to ask questions or bring up anything that comes to mind as we go along

OK, now let's find out **who you are**. We're going to go around the room and have you introduce yourselves, telling us what you do and what your specific roles are with respect to the Building 170 project. Please tell us:

- Your name, title, and affiliation
- Your job responsibilities
- Your role in the Building 170 project

<Round robin on roles and responsibilities – be sure to thank each person>

Part B: Project Status (1:45 PM – 2:00 PM)

The next topic is the status of the project. We're going to talk about four different things:

- **Who's** involved in the project right now (the project team)
- What's the **current status** of the project and what's been done to date
- What's the **timeline** for the project from this point on
- What decisions have been made about the project **budget**

1) Who's involved in the project right now?

We've grouped the people we know about into five main groups:

- 1.0 Future tenants – AEPI and AEC People
- 2.0 Future landlords – you all
- 3.0 Design/construction people – the Corps of Engineers
- 4.0 Context stakeholders – everyone in the surrounding district and communities who will be affected by the project and the building when it's operational
- 5.0 Owner – the Army at large, including FORSCOM and the Assistant Secretary for Installations and Logistics

Did we miss anyone?

Who specifically are the important people from each of these groups?

<Stakeholder Map of who's involved>

2) What's the current status of the project? What's been done to date?

We know about the following activities:

- 1.0 Lead/asbestos/hazard surveys
- 2.0 DD 1391
- 3.0 Southface sustainable design workshop and initial survey
- 4.0 Some renovations, including roof replacement and taking down suspended ceilings

What else has happened?

What's going on right now?

Is work that's been done to date being covered under the scope of the DD1391?

<Timeline and responsibilities for Past Project Activities>

3) What's the timeline for the project from this point on?

- Has the project team been firmed up?
- What are the major milestones?
- Has funding been allocated for the project?
- Has a date been set for move-in?

<Future Project Timeline and Milestones>

4) What decisions have been made about the project budget?

As per the DD1391, the requested budget amount was \$3.3 million dollars.

- Has this changed?
- Have any unanticipated cost items since been identified?
- Has the money actually been allocated yet?
- Where has the money come from for activities performed to date?

Many design items have been identified in other studies that might increase the first cost of the project. Where might this money come from? What will happen to savings in operational costs, if any?

Other questions that will be touched upon again later:

- What will be the O&M budget for this facility?
- What cash flows will be tracked over its life cycle?
 - 1) Energy and other utilities?
 - 2) Revenue from tenants?
- 3) Has anyone done a life cycle cost analysis of the building as part of DD1391? If so, what assumptions were made about operational costs?
- 4) What is the standard payback period that's considered acceptable for project enhancements? Was any amount budgeted for these kinds of improvements?

Part C: Project Resources and Constraints (2:00 PM – 2:20 PM)

Note: the following questions are listed in rough order of priority. Questions indicated by an asterisk (*) will be asked as time permits.

The next two parts of the session are going to be structured mostly as open discussion. We've got questions for you about the resources, constraints, project team, and other details that pertain specifically to this project. As we go along, we'd like you to think about any documentation, either project-specific or general Army policy, that would be useful in supporting your answers to these questions. Please let us know as you think of anything, and we'll make a note so we can review the documentation later.

This next part of the session is aimed at helping us determine the **feasibility** of recommendations we'll be making to AEPI. We need to know what resources, including labor, equipment, and funding, will be available over the life cycle of Building 170. We don't want to recommend any technologies that will not be maintainable or that will cost too much to operate or replace. We hope you can give us some guidelines on how to make these determinations.

Let's start with people resources:

- Who will be responsible for operating and maintaining Building 170? Will it be in-house people or contractors?
- If contractors, will you use the same contractors you presently use, or might new ones be selected?
- What is the basis for selecting O&M contractors? What kind of contract do they have?
- (*) Are there any limitations of which you are aware regarding the skills and abilities of these people?
- (*) How about limitations with respect to the equipment and systems they use?

Next, the all-important issue of budget:

- How much money will be available for operating and maintaining this building?
- Has any life cycle analysis been done to optimize costs over the life cycle?
- How is the O&M budget set? Who decides?
- Is money allocated to specific buildings, or is it a single pot of money that supplies all building needs?
- (*) Is there a maintenance backlog at Fort McPherson? If so, how do you decide which projects get priority, and which can wait until more funding is available?
- (*) Is life cycle costing used to balance cash flow requirements among facilities? For example, in choosing a roofing system, did you look at what year the roof will need to be replaced, and where the money might come from at that time?
- (*) If you use life cycle costing as a basis for making decisions about maintenance projects, what is your required payback period (or rate of return) for investing in building systems? For example, are you willing to spend more on energy efficient lighting if it pays for itself in less than a year? This could be dependent on whether funding for operations and maintenance comes from the same pot of money.
- Are there any other budget-related constraints at ANY phase of the life cycle that we should be aware of?

Any other thoughts on resources or constraints that we should know about? If not, let's move on to the project team.

Part D: Project Team (2:20 PM – 2:35 PM)

At the beginning of the session, we made a map of who is involved in the project. Let's revisit the map now to see if we can flesh it out a bit.

There are people who *will* be involved in the project that are not involved now. These include construction contractors, external designers, operations and maintenance contractors, and others.

- Have any of these contractors already been selected?
- What is the basis for selecting contractors?
 - What is the process for contractor selection?
 - Is pre-qualification used?
 - What are the criteria for pre-qualification?
 - What are the mandatory criteria for selection?
 - What optional criteria, if any, are used?
- Are there any other criteria that will be used for this project that are different from normal projects? If so, what are they?
- If you could add criteria for selection that you feel would help the project meet its goals, what would you add?
- What is the contracting mechanism for hiring contractors? Who administers the contract?
- Are there checks in place to verify contractor performance? If so, who is responsible for verification?

Other Interviewees

We need to meet with representatives from the following groups, and we'd like some ideas from you about who would be good to include:

- Future tenants, including AEPI and other candidates
- Army Corps of Engineers
- Context Stakeholders (people from surrounding district and communities)
- The Army at Large (including FORSCOM)

We'd also like you to identify anyone in particular you think would be good to talk to from your organization who is not in this meeting.

Part E: Project Objectives (2:35 PM – 3:15 PM)

Note: The items in this section correspond to questions from the written survey completed by the group prior to the meeting. Questions have been reordered to permit those questions with most discussion potential to be covered first. If time permits, questions marked with an asterisk (*) will be covered. For most questions, a flip chart list will be made of the responses, and participants will be asked to vote for those items they believe are most important. Voting will be done by giving each participant three sticker dots per question, and allowing them to allocate those stickers to questions to reflect their importance.

1) Overall Project Objectives

(corresponds to survey question 1.0)

What did you list as the top 3 objectives for the Building 170 project that must be met in order for the project to be considered a “success”? Are there any other objectives you think should be included in this list?

<List of Overall Project Objectives;

Have them choose top three via votes (sticker dots)>

2) Embodied Environmental Values

(corresponds to survey question 2.1)

One of the objectives identified by AEPI is to have the building reflect the environmental values of the Army. What environmental values do you think the project should exemplify? Are there any other values you think should be included in this list?

<List of Environmental Values;

Have them choose top three via votes (sticker dots)>

3) Demonstration of Cutting Edge Technologies/ Sustainable Construction Practices *(corresponds to survey questions 2.3 and 2.4)*

What did you list as technologies or sustainable construction practices that should be considered in this project? Are there any other technologies or practices you think should be included on this list?

**<List of Cutting Edge Technologies/Sustainable Construction Practices;
Have them choose top three via votes (sticker dots)>**

Did you list any concerns about using cutting edge technologies? Are there any other concerns you think should be included on this list?

**<List of Concerns;
Have them choose top three via votes (sticker dots)>**

4) Control of Life Cycle Costs *(corresponds to survey question 2.12)*

What did you list as worthy investments to control life cycle costs? Are there any other items you think should be included on this list?

**<List of Life Cycle Cost Investments;
Have them choose top three via votes (sticker dots)>**

5) High Quality, Productive Workplace *(corresponds to survey question 2.14)*

What features did you identify as being important for a quality workplace? Are there any other features you think should be included on this list?

**<List of Workplace Attributes;
Have them choose top three via votes (sticker dots)>**

*** Historical Preservation** *(corresponds to survey question 2.13)*

What did you identify as being important to preserve from a historical standpoint? Are there any other features you think should be included on this list?

**<List of Features for Historical Preservation;
Have them choose top three via votes (sticker dots)>**

*** Control of Project First Cost**

(corresponds to survey question 2.11)

What did you list as project cost drivers? Are there any other items you think should be included on this list?

**<List of Project Cost Drivers;
Have them choose top three via votes (sticker dots)>**

*** Lessons Learned**

(corresponds to survey question 2.5)

Anything about lessons learned that you want to discuss?

Is a system already in place to capture lessons learned? If so, what is it like?

Do you formally use lessons learned from other projects as part of your job?

*** Executive Order Compliance**

(corresponds to survey question 2.2)

Which EOs did you identify as being important? Why or why not?

Discussion of overall feeling on the importance of EOs.

*** Traffic Congestion**

(corresponds to survey question 2.6)

What did you list as measures to be taken to manage traffic congestion? Are there any other measures you think should be included on this list?

<List of Traffic Congestion Measures>

*** Air Quality**

(corresponds to survey question 2.7)

What did you list as measures to be taken to manage air quality impacts? Are there any other measures you think should be included on this list?

<List of Air Quality Measures>

*** Water Quality and Supply**

(corresponds to survey question 2.8)

What did you list as measures to be taken to manage water issues? Are there any other measures you think should be included on this list?

<List of Water-related Measures>

*** Urban Sprawl**

(corresponds to survey question 2.9)

What did you list as measures to be taken to manage urban sprawl? Are there any other measures you think should be included on this list?

<List of Urban Sprawl Measures>

*** Economic Development**

(corresponds to survey question 2.10)

What did you list as measures to be taken to encourage economic development? Are there any other measures you think should be included on this list?

<List of Economic Development Measures>

Part F: Project Details (3:15 PM – 3:30 PM)

Note: This section to be included in dialogue if time permits. If not, these questions will be posed to the group via a follow-up email.

We're in the home stretch now. We have a few final details to clear up – some questions we could not answer from our review of project documentation. We'd like to pose them to you now. Again, please keep in mind that we'd like to know about any documentation that should be reviewed to help us get a better idea of what this project is all about.

1) Background Questions

- When did the building go out of use? **97 or 98**
- Who is the likely tenant(s) to occupy Building 170 in addition to the AEPI? **Once talk of the Southern Division of Corp. of Engineers, but they are probably too big (ask Mike)**
- What was the correct date of initial construction? Both phases. **170 A was begun 1929, completed 1930. 170 B, completed in 1939.**
- What is the expected number of AEPI employees to occupy Building 170?
- What is the correct number of acres on site? **496 acres**

2) Infrastructure Questions

Water Supply and Wastewater Treatment

- Are drinking water and wastewater treatment services provided by City of Atlanta? If so, is the primary source of fresh water from the Chattahoochee River, or from some other source? **Believes it is City of Atlanta water and wastewater. Could be East point. No on-site water treatment.**
- How much water used and wastewater treated? Is there any breakdown by activity types (e.g., domestic, industrial, irrigation, etc.)?
- Type of water supply line system? Clay tile piping? Copper? What's the capacity? Condition?
- Has there ever been a water supply audit? If so, when? What were the findings? Do present supply pipes need lining?
- Has there ever been an audit of stormwater and wastewater collection/distribution systems? If so, when? What were the findings?
- Is stormwater captured and used to water the golf course?
- Will Building 170 be submetered?

Solid Waste

- How is solid waste collected and disposed? Landfill on post? Incineration?
- How is C&D waste collected and disposed? Rubble landfill?

- What, if any, recycling infrastructure exists on post? What materials are recycled? What is their fate?
- Are there official policies on waste and/or recycling?
- Are waste quantities and composition monitored by building?

Building Services

- Who are the Internet providers for the post? Is there one for the entire post, or does each organization procure its own ISP services?
- Is there a post intranet?
- Who provides phone services on post? Is there one for the entire post, or does each organization procure its own phone services?
- Will AEPI provide its own web hosting, or is this part of post services?

Fort McPherson Site

- What soil types exist on post?
- Are there any endangered or threatened species?
- Are there any known environmental hazards?
- Are there any known cultural or anthropological resources on post?

Power and Energy

- What are the energy sources used on post? Is power provided by an external utility? If so, who? How much?
- Are there other on-post sources of power used, such as fuel oil, steam, natural gas? If so, for what and how much?
- Are buildings sub-metered?
- Will Building 170 need to be rewired?

Fort McPherson Building 170

Stakeholder Group Interview

Fort McPherson Garrison Personnel

This is the transcript for Session 1: Group Interview with the Garrison Personnel. Date of the session is 16 January 2001. See interview guide for additional information on the structure of the session. Session conducted by Sheila Bosch, Corey Fischer, Annie Pearce, and Carl Leneis. Present as observers were David Eady and Jorge Vanegas. Session participants included Beth Grashof, Mike Hutt, and Dave Barber.

1:30 – 1:45

Welcome and Introduction

(Late start – 1:40) Introduction of Georgia tech team.

You all were present for the Southface charette. What AEPI has asked us to do is a complementary study to find additional ways to improve the sustainability of Building 170. One of our tasks is to talk to different stakeholders; we want to get the views of all the different stakeholders separately. No one objects to being videotaped. Does anyone mind if we use your names in the report? No one objects to use of names with comments.

<The agenda for the meeting is presented; see Protocol>

Introductions

Beth Grashof – Cultural resources manager and historic architect for FORSCOM and Fort McPherson. Responsibilities are to guide the maintenance, rehabilitation, retrofit, adaptive reuse, etc. of buildings at Fort McPherson according to cultural resource management laws, Army regulations, and state historic preservation guidelines. For Building 170, Beth's responsibility is to provide a historic preservation slant to the design and make sure that Department of Interior guidelines are followed, specifically Section 106 of the National Historic Preservation Act. Document AR 204 is the Army regulation that gets followed for projects like this; it requires the Army to take into account the effects of their actions on historic resources.

Mike Hutt – architect and civil engineer; Garrison project manager. Mike will oversee the project from whole construction to occupancy. Mike filled out DD 1391 for the project, provided a project description, and developed preliminary drawings for demolition.

David Barber – Chief of the Environmental Division of the Garrison. David's roles in the Building 170 project have been limited. Dennis Kinickey was spearheading the environmental efforts for this project. He has retired (last week). He was the Energy Conservation program manager. A new one will come on board in two months; meanwhile, David will be performing those responsibilities. His main role is to keep an overall eye on the environmental aspects, including historic resource aspects, of the program. He will also keep an eye on the sustainable design and development aspect from a programmatic standpoint. He wants to comply with EO 12123.

Project Status

{GT} We have seen some obvious changes since July. Who is involved in the project right now? Who's on the team?

Mike Hutt and a person who works with the contracting officer (Contracting Officer's Representative)– Grady Myrick. He's not here today. He needs to be involved in the study; he will follow the project through to completion.

{GT} Where does the project stand right now?

{MH} We are finishing up with lead-based paint and asbestos abatements and removal of pigeon dung in the attic. Those have been abated. All old HVAC, mechanical, and plumbing systems have been removed. All sinks, toilets in funny locations, etc. have been removed (including bedpan washers).

{DE} We tried to incentives the contractor to find good uses for salvaged materials. Did he do that?

{MH} He is supposed to provide us with a list of what went where. He's an environmental contractor who does asbestos abatement, pigeon dung removal, etc. He also removed plumbing and other systems. The demolition contractor's name is Diversified Environmental.

{GT} Are there any others involved?

{MH} What's just beginning is the replacement of the roof. The roofing contractor is setting up. The building has a slate roof that is to be replaced. The old slate will be removed. The acidity from air pollution has made it very brittle. Scaffolding is being used around the whole building since the slate is weak. This contractor is also doing work on the gutters. The roofing contractor is Murtin Roofing.

{GT} Timeline for the project – are there milestones coming up?

{MH} We're behind the 8 ball by about 4 months. The design work needs to get started. The other thing is to make the windows operable and get the building weather tight. That hasn't been done yet. The design documents are complete for this, but it can't proceed without funding. Right now [funding] is the main holdup.

{DE} The building was programmed in to be done at some point in time. Is there a renovation schedule that would have been done if Ray Clark hadn't thrown AEPI into the picture?

{MH} 65% design has been done to convert the building into a hotel. The project was over budget and had to go over for VE (value engineering) review. When VE happened, they found that they didn't really need a hotel, so the project was abandoned.

{GT} Are there any others currently involved in the project?

{BG} What about Thelma? She's working for David.

{MH} The approach is for Grady to be involved with actual demolition contracting. He will be the CO (contracting officer) for any other parts. Demolition is the only part that's currently on his radar screen.

{DB} One of the things that's extremely important when doing sustainable design and development is that the process is delineated and followed to a T. I'm not getting a warm and fuzzy that sustainability is being considered. We're now in demolition, and it looks just like regular demolition. Every part of the sustainable design program and process needs to be documented from a sustainable design and development perspective. The charrette was done that way, but I don't know if there has been any follow-through since then.

{DE} There's a consciousness in what we're trying to do here. There are discontinuities and we're learning as we go. It won't be ideal, but we're trying to reveal what that process would be. This is not an unusual project.

{DB} This project is important to us. We need to look further down the line and realize that the process is more important than this particular project. We want to create a system that ensures that all future projects have sustainable design and development built into them. That's the tough nut to crack as far as the Garrison is concerned. We're used to doing things in a piecemeal way, with demolition followed by rehab, etc. We're not used to doing things in an integrated fashion. We need to keep our eyes on what we're trying to accomplish, not only for the end user but also for the Garrison.

{GT} With respect to the budget, have any decisions been made?

{MH} There is a budget defined by the DD 1391. We don't have the money yet. It has been approved, though. Some money has come in under the auspices of this document. It came from ACSIM, who sent the money to FORSCOM.

{GT} In deciding whom we should talk to, we've identified five different stakeholder groups. We'd like to ask if you have any ideas for whom we should talk to in these groups. We know one of the future tenants is AEPI. Who is the other tenant?

{MH} The other tenant was to go into 170A. It is the Army Air Traffic Controllers. They are not solid enough to interview yet.

{DE} Has there been a commander designated so we can identify their user requirements?

{MH} It's a headquarters function. It will be 40 people, which won't fit into 170A. They will have to divide up, maybe separate contractors from internal staff.

{DE} AEPI has about 30 people, combined with SREO (Southern Regional Environmental Office). They presently occupy about ten thousand square feet.

{Joke} That's a good design constraint – there are too many people to fit into the building.

{DE} The SREO, which is a part of AEC (Army Environmental Center), will probably be going with AEPI, since they're not big enough to sustain an office on their own. They also have direct reporting responsibilities to George Correllas.

Future Landlords (you folks):

{DB} DIS will be responsible for maintenance of the building. Would suggest speaking with Marvin Head and LTC Abernathy (who couldn't make this meeting). Does he have

any strong feelings about this project? No, just to have an occupied building (unlike Col Clingempeel). Comment: that's a good thing.

{GT} How about Architects, Engineers, and Construction people (A/E/C) – is this the Corps?

{MH} No. They have open-ended contracts with A/E firms. One firm has been approached with an SOW, based on the Southface report. The architect came back and had some concerns with new technologies from the charrette. They have not talked, since there's no money to pay them yet. The Corps will not be involved. The POC is Rick Latham (POC), and the company is XXX (fill in later).

Context Stakeholders:

{GT} Are there other groups near the building who might be affected?

{MH/DB} The Military Police (MPs) are across the street. The Criminal Investigations unit is also across the street.

{GT} Our purpose is to find people who might use building amenities such as outdoor areas, walkways, etc.

{MH} People have always cut through the buildings (it's traditionally been a shortcut).

{BG/DB} You might consider an article in the Sentinel (local paper) that explains what we're doing and provides a contact to talk more about the project. You might have a series of questions to ask them. Bill Roche is ready, willing, and able to help us out. The paper has a set aside space for construction projects. Bill is responsible for filling that spot, and would be glad to help us.

{GT} How about the Army at Large, including FORSCOM?

{DB} The budget people in FORSCOM are the ones involved in this project, since the money comes from the Department of the Army to FORSCOM (MAJCOM). The people to contact are Ray Stoudemire and Richard Cumire (they're going to want cheap and easy).

{GT} Are there any groups we've missed?

{Group} Within FORSCOM, you could talk to Mannette Messenger and Jim Cobb, from FORSCOM Environmental.

{GT} We know about the charrette and some of the renovations that have taken place since then, such as the removal of the dropped ceiling. What else has happened since the charrette?

{GT} The work that's been done so far –has it been covered under 1391?

{MH} Yes.

{GT} Is there a date for move in?

{Group} (Laughter). There was – June of 2001.

{DB} It's caved due to lack of money. This would have been the date if all stars were in perfect alignment. You need to add at least 4 months. The project budget has stayed the same.

{GT} Have there been any unanticipated costs?

{MH} Yes. We need to establish now what design parameters are going to be added on top of [the parameters in the DD 1391] and how we'll pay for it. A lot of the energy savings things turned out to be first costs that would be saved in operations costs. Because that drives the first cost up, the 3.3 million may not be the right figure.

{DE} David Barber is going to cover the difference (laughter).

{GT} Have you figured an O&M budget for this building?

{MH/Group} This budget would be established after figuring out which systems will be used. We don't know yet if we'll use geothermal or whatever. Costs will be dependent on the system selected. If we went with a "normal" system, we'd be able to come up with those numbers. We have a square foot charge used to bill outside tenants. It will be adjusted to fit to this building.

Project Resources and Constraints

{GT} What cash flows are tracked over the life cycle of the building, e.g., energy, lease revenues, etc.?

{MH} When a piece of HVAC equipment needs to be replaced, that's all kept track of. So are utility bills, and other tenant-specific costs.

{DE} Is the building submetered? Are just tenant buildings submetered?

{MH} Tenant buildings AND Army buildings are either presently submetered or in the process of being submetered. There's an ESCO on board who is using meters. We've put meters in under energy programs and during minor construction projects (and major projects).

{GT} Has anyone done an LCC (life cycle cost) analysis? This includes figuring not only first costs but also life cycle costs, etc. Have these cash flows been mapped out?

{MB/DB} The 1391 is exclusively concerned with first costs. The LCC will be better accomplished by the designer of the building, after systems have been selected. The LCC will be a basis for selecting the most practical systems during the design process. This project is not far enough along.

{GT} Is there a standard payback period that is considered acceptable for these projects?

{DB} The Army looks at a 10-year cycle for HVAC systems – it's a standard cycle. Ten-year payback is standard. This brings up a good point. We have EOs (Executive Orders) that we have to comply with that deal with sustainable development. If the government truly wants to comply with EOs and get involved with sustainable design and development, some of the parameters such as payback periods will have to be thought of outside the box. Sometimes cheapest is not necessarily the best. On future projects, we'll have to look at this a bit differently. Not like FORSCOM typically thinks. It's alien to how we've traditionally done business. [Example of an HVAC system].

{DB} We have to make a determination that we're going to do everything in our power to comply with EOs, or no, we're not. All of this needs to be documented to show the effort we've expended to make the project how it needs to be.

{GT} Who will be responsible for O&M of the building – will it be done in house, or using contractors?

{MH} O&M is done using a combination of in house staff and contractors. You should talk to Marvin Head – the COR (contracting office representative) for Griffin Services, who is the contractor who does ordinary O&M work on post. When someone puts in a work order/service order, a Griffin person comes out and identifies the level of work to be done, and then it gets scheduled and gets done. Griffin will also do the work for Building 170.

{GT} What's the basis for selecting this contractor?

{MH} It's a 5-year, competitively bid contract.

{JV} In that contract, the provisions for executing work are on an as-needed basis. Who will determine if there's a basis for a green choice? Is the contract language flexible enough to allow you to specify specific sustainable choices?

{MH} The contract has no fixed cap. The contractor is selected based on his bid on a sample statement of work on a cost basis. That's not necessarily the work that will actually get done.

{JV} Is the work paid for on a unit cost basis for labor hours?

{MH} The contractor is not tied to a unit cost schedule. The contractor IS tied to a budget, though. He has certain amounts of money that he pays his worker. Say Beth wants a certain kind of window. The contractor will be able to adjust to that, and will charge accordingly. The contractor provides the labor, management, and material purchases. The Post can specify what materials, finishes, etc. they want for the building.

{JV} Is the contractor's cost of labor tied to type of materials?

{MH} No. Labor rates are separate.

{GT} Is there any system for establishing priorities for projects?

{MH} There's a work order review board that decides if something's frivolous. Whatever tenant screams the loudest, and has money, [gets priority].

{GT} Where does the money come from for maintenance?

{MH} Money is allocated for O&M from MAJCOM and also from tenants.

{GT} Are there any other budget constraints or LCC considerations we need to know about?

{Group} Just that we're limited in what we can do because it's a historic structure. That doesn't necessarily have anything to do with budget.

{DB} Continuous commissioning needs to be looked at more with respect to sustainable development. It needs to be built into O&M practices. It might be an added cost.

Project Team

{GT} What is the contracting mechanism for hiring contractors, and who administers it? Are they bid, or long term service contracts?

{MH} We normally always have some contract in place, for example, a 3-year contract, then we go to that contractor and negotiate a cost for a given scope of work. We also have the option to competitively bid a project if it's different from a normal project. That's the contracting officer's call. We have no say-so in that.

{MH} Contracting officers work for Army Atlanta Contracting Center – Building 131 at Fort McPherson. We're in an 8-A Hub zone, so the Small Business Administration dictates that we use 8-A contractors if qualified ones are available. In order to short circuit that a bit, they've established contractors that are qualified for certain requirements like the ones we run into all the time. We have four or five of these contractors sitting out there on 3-year contracts waiting for work to be thrown their way. The Contracting Officer will pick contractor A one time, then B the next, in order to be fair and give everyone their fair share. There are specialty contractors geared, for example, to abatement work, but who wouldn't be appropriate for general contracting work.

{GT} Have any contractors been identified for 170 specifically?

{MH} Yes. They include Protec Contracting and Company (windows restoration project and other environmental work) and Reams Enterprises, Inc. (does restoration and environmental work; have done good work in the past and will be good for the windows). For interior renovations, there's no design in place, so it's still too early to tell. The window work can proceed without a design.

{GT} How about landscaping?

{MH} Craftec Builders is one that is already in place and is doing other work for Fort McPherson right now. [Landscaping] would be the very last thing to get done in this project, unless it impacted other parts of the job like energy or environmental.

{GT} Is prequalification required?

{MH} They need to prove to the small business administration that they're qualified to do the work. They submit qualifications (construction experience) to show that they've done this work and have had satisfied customers.

{GT} Are there mandatory selection criteria?

{MH} The contractor has to be an 8-A firm. They need to be a small business and need to show through the provisions of the Act that they are disadvantaged under the regulations.

{GT} Are there optional criteria?

{MH} The contracting officer has the ability to go out and do a full blown competitive bid solicitation. The small business administration may step in in the middle and dictate that it go to an 8-A. A competitive bid may go to an existing contractor anyway.

{GT} What's unique about this project that might require specialized work? Maybe the mechanical systems?

{MH} These systems should be doable by anyone. It's going to be the design and planning that will require special attention. After plans and specs have been developed, construction can be done as usual. Design firm has a multi-year contract already. This particular person (we may not want to work with them) has voiced some disagreeable

resistance to doing new things that have not been tried before. The issue here is architect liability. The contract is set up by the Corps of Engineers and has all kinds of liability clauses in it. This will be an issue with nearly any contracted designer.

{DB} This is an institutional mentality and is probably why the Corps has not changed its specs since the 1970's. The guide specs need to change, the design guides need to change, the mentality needs to change.

{GT} This could be a potential problem. If the A/E firm has already been selected and has no sustainability experience, then you could lock yourselves into something unsatisfactory.

{DE} As a point of information, ACSIM is giving guidance to the Corps and the districts to include experience in sustainable design and development in the selection criteria. There is also sample language.

{MH} This particular A/E had a problem with liability and whether the design works or not. That's what he was getting at. They have no geothermal experience, and would just as soon not get involved in it. If it doesn't work, then they're liable.

{DE} There are enough authorities out there, though, that they could sub part of the design to those people or sub a design review to them to determine if such a system is practical in this application.

{DB} Just because we want to put something in this building doesn't mean that we can. We need to support design decisions with research and documentation. Then implementation won't be a problem since it's been done by a qualified individual. It's going to take more attention by the designer, though.

{MH} The designer does have the ability to subcontract. It may involve an additional cost for the design, though.

{JV} Is design build an option?

{MH} We thought that was the way it might go, and it was discussed with LTC Abernathy. The concern at that point was timing. We thought that we could get it going faster and retain more control by using in house people and established processes.

{GT} What is the basis for the designer's fee?

{MH} The designer's fee is based on percentage of proposed cost based on estimated man-days required (separated by profession – architect, structural, etc.), plus overhead and profit factors.

{GT} Is there a limit for design fees based on total installed cost (TIC)?

{MH} It's limited by the Brooks bill to 6% of TIC. It typically costs between 10-12% of the total costs when you add in reproduction costs, site visits, etc.

{GT} Is there a mechanism for checking that contract provisions and specs have been actually done?

{MH} That's Grady's job.

{GT} Is it really done?

{MH} Grady is the most likely of all of the contracting office representatives (CORs) to see that it actually gets done. If there are things that aren't done right, there are provisions for withholding payment. It usually works well. The COR is who signs off on the payment. If something isn't right, he won't sign off. He's responsible if something doesn't work out.

Project Objectives

< At this point, participants were asked if they had completed the questionnaire. Beth Grashof was the only participant who had already completed the questionnaire. The others have not. The facilitator explained that the next series of questions would focus on selected portions of the questionnaire. The rapporteur would note participant responses on a flip chart, and participants would then be allowed to assign three votes among all responses according to their opinions on the relative importance of each item.>

{GT} In terms of overall project objectives, what are your top 3 objectives for this project? If this project is to be considered a success, what conditions must be met?

- Reuse of a vacant historic building {BG}
- Innovative, adaptive use of the building whose design follows Secretary of Interior's standards for historic rehabilitation {BG}
- Showcase that green architecture and historic preservation are compatible objectives – that historic preservation IS green {BG}
- To get the building occupied and have the occupants happy with the result/occupant satisfaction {MH}
- Low maintenance {MH}
- Create something that is a showcase because there are a lot of other buildings that could benefit from the experience. There are a lot of historic buildings that can benefit from learning how to do this right. {MH}
- Energy conservation measures and affirmative procurement used to maximum extent (green purchasing, buy recycled, debris management, energy conservation, etc.) {DB}
- Document the project process with sustainable design/development – not just the project, but the overall project so that it could be placed in future design guidance for installation {DB}
- Compliance with Executive Orders {DB}

{GT} One of the formally stated objectives of the project was to create a building that embodies the environmental values of the Army and AEPI. What environmental values do you think are most important to be embodied in this project?

- Waste Prevention/Affirmative Procurement
- Efficient Energy Management
- Environmental Management

- Historic Preservation (has recently been ALWAYS considered for projects. Our mindset is that this is automatic as long as Beth's here. We're still behind on leadership in green design, waste prevention/Affirmative procurement, and energy management.)
- Historic preservation is a real important thing environmentally. The fact that all the bad things have been removed out of the building is a good thing. **Hazard abatement.**
- Clean Water (improves quality of life)
- Energy (improves quality of life)
- Clean Air (improves quality of life)

{DB} Basically you're breaking down how the Army defines environmental stewardship. We're taking a holistic environmental stewardship approach. We've done pieces of this, but only seen glimmers of a holistic approach.

{BG} Clean air and water impact quality of life. Energy also impacts quality of life, but also in a different way.

{GT} Say more about environmental management.

{DB} We were trying to link our environmental values to the Executive Orders. Basically greening the government through leadership in environmental management. I don't want to say "paradigm shift", but really it's a change in attitude in terms of having a more environmental management mindset, including EPCRA compliance, toxic releases, hazard abatement, etc.

{GT} Another objective that has emerged is demonstration of cutting edge technologies and sustainable construction practices. What are the top three most important technologies or practices you'd like to see demonstrated in this facility?

- HVAC Systems – control devices and method of providing conditioned air – it's important to ensure that the user has both control and realizes comfort (IAQ, humidity). Comfort is very subjective – one person could be cold while the other is hot. (List as two – user controls/comfort and efficient HVAC systems)
- Alternative energy sources
- Daylighting – the advantages of this building and its ability to use light are significant
- Conservation of and looking at use of site/site improvements
- It's going to be important to show how already common, usable, known techniques can contribute to a sustainable project. Not everything has to be cutting edge. Practical ideas, not just esoteric, cutting edge stuff. An example of common sense stuff is use of sensor controls for lighting or mechanical controls in seldom utilized areas. Based on times of use, comes on when needed.

{DB} This goes back to selecting a good A/E that has a solid knowledge base in this area. Coming up with good ideas is hard. If we don't have a good A/E, this could all fall flat on its face.

{GT} One thing that commonly comes up is concerns with using cutting edge technology. Are there other concerns besides finding competent A/E firms?

{MH} Trying to come up with a design and not being liable for things they're not familiar with. There are legal issues for the A/E.

{GT} If you pick the right design, you said that anyone could design, operate, and maintain it. Do you think it might be a barrier if people don't know how to maintain systems?

{DB} I've heard stories of people disabling parts of mechanical system because they don't know how to deal with it. People have an attitude about things they're unfamiliar with.

{DB} Fuel cells came up in a previous discussion with LTC Abernathy, and the comment was that no one knows how to service them. A lot of the problem is education of people who do O&M. What is new now is not new for very long. If you build systems that are technically challenging or tricky and not robust, then that's a problem. Part and parcel of the design work is to make sure this doesn't happen, and alternatives should be evaluated with this in mind. The designer should take responsibility for this. Training requirements should not be so specialized that O&M contractors don't want to invest in training to maintain them for only one or two buildings. All of this should be part of the process to select among alternatives.

{DB} Sustainable design doesn't have to be something three centuries ahead of its time. The process you take, the thought process used in selecting alternatives for materials and systems, that's important. As long as you can document your design decisions and ensure that you made the most environmentally practicable decision, then you're ok. It might not be what Mr. Greenpeace wants, but it needs to be a business decision. We're not just environmentalists, we're also landlords who are answerable to our tenants. We can't put them into a building where systems don't work. All systems have to be reliable. That's what tenants expect. They want a usable space where they can go to work.

{GT} When will the construction contractor be selected? (Questions from JV)

{MH} The contract will be traditional design-bid-build. The contractor will not have the opportunity to comment on design decisions. However, the contractor could be included as part of value engineering if it were desired.

{DB} There are processes that could be included if desired. There has to be a facilitator involved along the way to show where stuff needs to happen.

{MH} The preconstruction conference covers part of this. The contractor could speak up then and make suggestions for saving money. The charrette that happened this summer – those are the people that should be involved throughout design (say 65% design) to contribute ideas. These are the people that need to be carried throughout the process to make design comments as you go along. With that many people, it may seem to be

unwieldy. At the same time, each person brought specialized expertise to the table and contributed valuable information.

{GT} The last area we'd like you to elaborate on is creating a high quality and productive workplace. What are the features that you'd identify as being important for a quality work environment?

- Adequate lighting, especially natural light
- Good air quality (particulates, sensory smells/odors, humidity)
- Attractive looking space (interior design, materials selection, colors, quality of materials, neat, tidy, clean)
- Environmental controls (including operable windows, CO levels, etc.)

Project Details

{GT} We're at the end of our allotted time, so we'd like to ask if you'd be willing to clear up a few more details about the project via email. (Everyone indicated a willingness to answer further questions via email).

{GT} Does anyone have any comments or feedback about the process we've followed today to get information from you about the project?

{BG} The fact that you've separated us out is good in a way – we're all going to have different objectives.

{GT} That's why we wanted you to complete the survey ahead of time – so you could think about things without being biased by other stakeholders.

{DE} Sometimes that's not a bad thing, but that's what the voting is for.

{DB} After thinking about it, it may not be so important to contact Marvin and LTC Abernathy. We'd recommend just a follow-up for getting the questionnaire results.

<END>

Building 170 Project Detail Questions

Note: The questions contained in this list were developed as part of document review to set the stage for sustainability analysis of Building 170. Questions were included in the Group Interview Guide for Garrison personnel, but there was insufficient time to cover the questions during the group interview itself. Participants agreed to answer the questions via email. On January 29, SFI staff conducted a phone interview with Mike Hutt to establish answers for most of the questions. Additional responses provided by other participants will be used upon receipt to validate the answers provided by Mr. Hutt. Selected responses provided by Beth Grashof are included where noted.

1) Background Questions

- *When did the building go out of use?*

1997 (corroborated by Beth Grashof)

- *Who is the likely tenant(s) to occupy Building 170 in addition to the AEPI?*

There was once talk of the Southern Division of USACE, but they are probably too big (Beth Grashof).

- *What was the correct date of initial construction?*

The north half of the building, 170 A, was begun in 1929 and completed in 1929. The south half of the building, 170 B, was started in 1933 and completed in 1934. A bridge connecting the two structures was added in 1939.

- *What is the expected number of AEPI employees to occupy Building 170?*

Using U.S. Army standards, each half of the building will hold 33 people. These standards specify lower density than many other standards – there may be more people than that.

- *What is the correct number of acres on site?*

497 acres (Beth said 496). The Building 170 site is approximately 3/4 acre. Of the total Fort McPherson site, 172 acres are golf course.

2) Infrastructure Questions

Water Supply and Wastewater Treatment

- *Are drinking water and wastewater treatment services provided by City of Atlanta? If so, is the primary source of fresh water from the Chattahoochee River, or from some other source?*

All potable water on-site comes from the City of Atlanta and the City of East Point. Water supply enters the installation at three different points: two from the City of Atlanta at Campbellton Road (62 gpm capacity) and Lee Street (54 gpm capacity), and one from the City of East Point at After Avenue (59 gpm capacity) near the MARTA station. Both Atlanta and East Point draw their water supply from the Chattahoochee River. There is no on-site water treatment. All wastewater collected via sanitary sewer is piped off site to the City of Atlanta's Utoy Creek Treatment Plant. Stormwater is collected on site and piped to four lakes on post (each of which is a few acres in size). These lakes supply sprinkled irrigation systems for the golf course (via two 650 gpm pumps) and the baseball fields (one additional pump). The majority of landscape irrigation on post is supplied by these stormwater collection lakes. The one exception is the parade field in the historic district, which uses potable water for irrigation since it is not close enough to pump from the lakes. No stormwater treatment is provided other than normal settling in the collection lakes, since there are no industrial processes to contribute significant contamination at Fort McPherson.

- *How much water is used and wastewater treated? Is there any breakdown by activity types (e.g., domestic, industrial, irrigation, etc.)?*

90% of all potable water is used for drinking and flushing toilets. The majority of irrigation water comes from the collection lakes.

- *What type of water supply line system exists? Clay tile piping? Copper? What's the capacity? Condition?*

The entire water distribution system on post was completely replaced in 1991-1992 with Schedule 80 PVC. Portions of the system were 120 years old, and desperately in need of replacement. Incoming capacity includes three supply lines from Atlanta and East Point with capacities of 62 gpm, 54 gpm, and 59 gpm, respectively.

- *Has there ever been a water supply audit? If so, when? What were the findings? Do present supply pipes need lining?*

No audit has been conducted in recent history since the entire distribution system was replaced only ten years ago.

- *Has there ever been an audit of stormwater and wastewater collection/distribution systems? If so, when? What were the findings?*

There was a lot of work done on stormwater when the golf course was upgraded in 1993-1994. Approximately 5,000-6,000 linear feet of reinforced concrete distribution lines were replaced with corrugated PVC to address issues of sinkholes caused by leakage due to low lips on the concrete pipe. Some pipes were up to twenty feet below grade, causing the potential for serious safety issues due to soil loss. The golf course was previously supplied with irrigation water from an elevated water tank, but this system was removed in 1991. It had been abandoned prior to that.

- *Is stormwater captured and used to water the golf course?*

Yes – see answer to previous question.

- *Will Building 170 be submetered?*

Yes – each side of the building will be separately metered for water, gas, and electric.

Solid Waste

- *How is solid waste collected and disposed? Landfill on post? Incineration?*

Solid waste services are presently provided by Waste Management, Inc. All solid waste is collected in dumpsters around post and transported to Live Oaks Landfill, a regulated municipal solid waste (MSW) landfill.

- *How is C&D waste collected and disposed? Rubble landfill?*

C&D waste is collected on a job-by-job basis by specific contractors hired for that purpose. All waste is disposed in a regulated MSW landfill, not a C&D waste landfill, due to past problems with contractors adding non C&D waste to their hauls. For Building 170, demolition waste is being handled by the demolition contractor, Diversified Environmental. The contractor was instructed to recycle wherever possible, and to date has verified that metal from the demolition was recycled. Documentation of additional recycling is expected at the completion of the contract. Specifically, the contractor investigated recycling the ceiling tiles, but Mr. Hutt was unsure if they were actually recycled. Lab cabinets containing stainless steel and soapstone tops were hauled off by an individual for salvage. Some demolition waste from the building had to go to a hazardous waste landfill, specifically asbestos containing materials.

- *What, if any, recycling infrastructure exists on post? What materials are recycled? What is their fate?*

The Army's Atlanta Contracting Center has hired Reams Enterprises, out of Madison, GA to provide recycling services for the post. At present, paper, cardboard, plastic, and aluminum cans are recycled. There may be others, but Mr. Hutt was unsure. Mr. Hutt had no specific information about the collection system or the fate of collected materials. For all renovation projects, the contract language specifies that contractors must "recycle whatever possible", but many small contractors usually don't.

- *Are there official policies on waste and/or recycling?*

The Garrison-level Engineering Division has a Standard Operating Procedure on recycling, but Mr. Hutt does not have a copy of it.

- *Are waste quantities and composition monitored by building?*

No documentation is known to exist.

Building Services

- *Who are the Internet providers for the post? Is there one for the entire post, or does each organization procure its own ISP services?*

FORSCOM provides a service called ForceNet. Tenants can either use this service, or hire their own outside ISP.

- *Is there a post intranet?*

Yes, with at least two dozen domains.

- *Who provides phone services on post? Is there one for the entire post, or does each organization procure its own phone services?*

Fort McPherson has its own main switch, with service provided by BellSouth. Service comes on post via fiber, then goes to the main switch in Building 205. Other buildings are served by local nodes off the main switch. Building 170 is close to Building 205, so it will receive service directly from the main switch. Building 170 will likely be wired with fiber optic service (as Building 171 presently is). A FORSCOM contractor provides O&M services on the nodal system. For complex projects, Fort Mammouth (NJ) gets involved to provide services. Tenants use telephone contractors to perform additional services, and have the option to use on-post nodes or go outside to find other services.

- *Will AEPI provide its own web hosting, or is this part of post services?*

AEPI can choose whoever it likes to provide web services.

Fort McPherson Site

- *What soil types exist on post?*

Georgia clay. Mr. Hutt was unaware of any soil sampling studies that had been done on post.

- *Are there any endangered or threatened species?*

No.

- *Are there any known environmental hazards?*

There are two main hazards present on post. The first is a 20 acre gas plume resulting from tank overfill at an on-post gas station built in 1957. This plume is presently being treated by the USACE Savannah district using a soil vapor extraction (SVE) system. The old gas station was moved, and the former site is now just grass with fences around the SVE vents. The second problem required \$2.5 million to get rid of a landfill consisting of ash from an on-site medical waste incinerator. The landfill was located near a creek, resulting in soil and water contamination from the metals in the ash. The soil was excavated and transported to a hazardous waste landfill in Alabama. This project was completed in 1993-1994 during the golf course project. A study of the contamination was performed by Black & Vech. This was a USACE project, with funding shared from a new barracks project and the golf course upgrade.

- *Are there any known cultural or anthropological resources on post?*

Fort McPherson is home to a variety of historic buildings located primarily in its historic district. No other known cultural or anthropological resources exist.

Power and Energy

- *What are the energy sources used on post? Is power provided by an external utility? If so, who? How much?*

All electrical power on post is provided by Georgia Power. The post has two feeds from two different Georgia Power substations. When power goes out at one substation, the second kicks in within 28 seconds. Building 170 will not have a back-up generator, nor will it be supplied by a system with such a generator. The one exception is that the central heating plant that provides district heating for Building 170 has a back-up generator to bring up the boiler in the event of a power failure.

- *Are there other on-post sources of power used, such as fuel oil, steam, natural gas? If so, for what and how much?*

Natural gas is used for heating (via a steam-based district energy system) and hot water. Boilers (located in the central plant in Building 160) are supplied by 6" or 8" natural gas supply lines, with natural gas supplied by Georgia Natural Gas (formerly Atlanta Gas & Light). The post is on a system that allows drops in supply pressure during peak periods. When this happens, a propane air mixing plant automatically kicks in that mixes high pressure air with gas to fire the boilers. The valve that activates the mixing plant is solar powered. This system is frequently activated, and is actually cheaper than operating strictly on natural gas. The plant is expected to pay for itself in operational savings in ten years.

- *Are buildings sub-metered?*

Yes, 85-90% of all buildings on post are sub-metered. This has been ongoing since the 1980's in conjunction with other maintenance, renovation, and construction projects.

- *Will Building 170 need to be rewired?*

Yes, and it will be done as part of the interior design contract.

Fort McPherson Building 170

Stakeholder Group Interview – Additional Notes

Project Team

- Mike Hutt
- Grady Myrick – contracting officer representative – **we need to get involved;** working on demolition right now
- Dave Barber
- New conservation person (will not be in place for ~ 2 months)

Timeline

- No official project schedule.
- At least four months behind original intent.

Status

- Work completed to date (under the direction of Mike Hutt):
 - Lead abatement
 - Asbestos abatement
 - Old plumbing removed
 - Garbage removed
 - Pigeon dung removed
- Contractor is supposed to provide documentation on material reuse/recycling (contractor = Diversified Environmental). No documentation is available yet.
- No tenant designs for anything.
- No design firms selected.
- Roof is getting ready to be replaced (contractor = Morton Roofing)
- DD1391 money is held up somewhere.

Budget

- DD 1391 amount of \$ is correct (\$3.3 M)
- Received some of the \$
- Need to determine how the cover the increased first cost (mostly energy related capital expenses)
- Money flow? Money is held up somewhere in the chain.
- No detailed pricing done by the Army to substantiate requested amount.

Stakeholders

Tenants

- AEPI needs 10,000 square feet
- Southern Environmental Regional Office (part of AEC) – coming with AEPI
- North part of building – Army Air Traffic Controllers (~ 40 people)

Garrison

- Landlord
- Should try to get survey from LTC Abernathy and Marvin Head
- Nobody seems to know what Operations has to say about the project.

Design & Construction

- Corps will have no involvement except to set-up contract with A-E firm
- A-E firm has been selected from the pre-approved contract list. This contractor also did work on building 171. The A-E firm has reviewed the Southface charrette and have some reservations about some of the technologies.
- “8-A” Small business contractors will be used for construction work.

FORSCOM

- Budget people
- Environmental people (include Jim Cobb, cultural/natural resources branch chief)
- Ray Stoudemiere

Project Objectives

The following is a list of an individual's top three responses in each category. The number after the item is the total count for dot voting.

Overall Project Objectives

- Reuse of historic, vacant building (2)
- Innovate, adaptive reuse that meets DOI standards (Section 106 documents); National Historic Preservation Act
- Showcase that historic preservation and sustainable design are compatible; HP is green (2)
- Low maintenance (2)
- End user/occupant satisfaction (1)
- Energy conservation (1)
- Affirmative procurement used to highest extent
- Documented project process for future design projects (1)
- Compliance with executive orders

Embodied Environmental Values

- Waste prevention/affirmative procurement (1)
- Energy management
- Environmental management (change in attitude toward environmental stewardship) (3)
- Historic preservation (3)
- Hazard abatement (1)
- Quality of life as defined by having clean air and water (1)

Cutting Edge Technologies/Sustainable Construction Practices

- Efficient HVAC (2)
- User control/comfort
- Alternative energy sources (1)
- Daylighting (2)
- Site improvements/technologies (3)

- Automatic systems (i.e. sensors) (1)

High Quality, Productive Work Places

- Adequate lighting (natural light) (3)
- Good air quality (particulate matter, humidity control) (3)
- Attractive space (interior design) (3)
- Environmental controls

Questions that need to be answered:

- Who decides what goes in the project?
- Who picks a design team?
- Who pays the design team?
- Who picks a general contractor?
- Who pays the general contractor?
- Who documents the process?
- Who picks 'sustainable' features?
- Who outlines the process for all these things?

Tab 6

FORSCOM Stakeholder Protocols and Data

Fort McPherson Building 170
Baseline Stakeholder Survey
FORSCOM Level Compiled Results

Section 1: Overall Project Objectives

Please list your top 3 objectives for the Building 170 renovation project that must be met in order for the project to be considered a “success”, in your opinion.

- DA provides funds to complete the project.
- The renovation is documented and the “building as briefing” concept is implement as a showcase/lessons learned for other installations. The projected decreases in life cycle cost and pollution are calculated and communicated.
- AEPI moves into the building and develops a closer relationship with the FORSCOM environmental branch.
- Optimum Energy Conservation efficiencies
- Optimum Environmental values
- Minimized historic building renovation cost
 - Complete the project in time
 - Get enough resources to accomplish the project
 - Discuss with customer about the in process action taken.
 - Project should accommodate adequate space for AEPI, DoD Regional Ofc, and FORSCOM Env Branch
 - Project should incorporate numerous sustainable design features to serve as a showcase for future building design
 - Cost effective

Section 2: Specific Project Objectives

2.1 Embodied Environmental Values

How important, in your opinion, is it to have Building 170 exemplify the environmental values of the organization you represent? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		1	2	

Please rate the importance of the following environmental values, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Preservation of natural ecosystems		1	2
Resource efficiency/waste elimination			4
Preservation of biodiversity		2	
Water conservation		1	3
Energy conservation			5
Improving quality of human life			4
Equitably meeting human needs		3	
Other:_____			
Other:_____			

2.2 Executive Order Compliance

How important, in your opinion, is Executive Order compliance for the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	1	1	1	

Which of the following EOs are important to you regarding the Building 170 renovation? Select as many as necessary.

- 2 EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- 3 EO 13123: Greening the Government Through Efficient Energy Management
- 1 EO 13148: Greening the Government Leadership in Environmental Management

Other (please specify):

- 0 Other
- 0 None

Why is compliance with these EOs important or not important?

<None listed>

2.3 Sustainable Construction Practices

How important, in your opinion, is it for the Building 170 project to become a premier example of sustainable construction practices? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			3	1

Please list any measures that should be taken, in your opinion, to ensure that Building 170 becomes a premier example of sustainable construction practices:

- Go for LEEDS platinum rating
- Limit paved parking areas-maintain or increase vegetation, natural light

2.4 Demonstration of Cutting Edge Technologies

How important, in your opinion, is it to demonstrate the use of innovative, cutting edge technologies in the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			3	

Please rate the importance of demonstrating cutting edge technologies in the following categories, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Site and landscape technologies	1		2
Energy technologies		1	4
Water-related technologies		1	3
Cutting edge building materials			4
Technologies for indoor environmental quality			3
Waste treatment technologies		1	2

Please list any specific technologies that should be considered for use in the Building 170 project, in your opinion:

- Porous paving brick that allows rainfall to seep into the site rather than run off.

Please list your top 3 concerns associated with demonstrating cutting edge technologies in this project:

- Failure of the technology

2.5 *Capture and Documentation of Lessons Learned*

How important is it, in your opinion, to capture and document “lessons learned” from the Building 170 renovation? Please rate on the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			3	1

Please rate the relative importance of the following kinds of lessons:

	Not Important	Somewhat Important	Extremely Important
Project Barriers/Challenges		2	
Methods for Overcoming Barriers		1	1
Project Successes		1	1
Other: Cost/Benefit Analysis			1
Other: Pollution and energy/material use reductions achieved			1

2.6 Traffic Congestion

How important is it, in your opinion, to minimize traffic congestion with respect to Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	2	1	1	

To what extent do you believe that undesirable increases in traffic congestion are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
	2	2		

Please list any specific measures that, in your opinion, should be used to manage or mitigate the traffic impacts of this project:

- There is not a traffic congestion problem on this post.

2.7 Air Quality

How important is it, in your opinion, to minimize the contribution of Building 170 to poor air quality? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
	1		3	

To what extent do you believe that negative impacts to air quality are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
2	2			

Please list any specific measures that, in your opinion, should be used to manage or mitigate the air quality impacts of this project:

<None listed>

2.8 Water Quality and Supply

How important is it, in your opinion, to maximize the contribution of Building 170 to good water quality and to ensuring that sufficient quantities are available, to the greatest extent possible? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			2	1

To what extent do you believe that undesirable effects on water quality and/or supply are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
1	1	2		

Please list any specific measures that, in your opinion, should be used to manage or mitigate the water quality and supply impacts of this project:

- Local DPW should conduct the study and evaluate.
- Parking lot runoff

2.9 Urban Sprawl

How important is it, in your opinion, for Fort McPherson to address urban sprawl efforts in the metro Atlanta area through its efforts with Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
1	2	1		

To what extent do you believe that urban sprawl is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
2	1	1		

Please list any specific measures that, in your opinion, should be used to manage or mitigate the urban sprawl impacts of this project:

<None listed>

2.10 Economic Development

How important is it, in your opinion, for Building 170 to contribute to economic development in the East Point and metro Atlanta areas? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
2	1	1		

To what extent do you believe that economic development is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
3		1		

Please list any specific measures that, in your opinion, should be used to increase the positive economic development impacts of this project:

<None listed>

2.11 Control of Project First Cost

How important is it, in your opinion, to minimize the initial project cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		2	3	

Please list the top 3 aspects of the project that are most likely to affect the initial cost of the project, in your opinion:

- No idea
- Change in Scope of Work and modifications
- Labor and material cost

- Demands from tenants beyond necessary

2.12 Control of Life Cycle Costs

How important is it, in your opinion, to optimize the life cycle cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			2	2

Please list the top 3 aspects of the project that are worth additional initial investment to control life cycle costs, in your opinion:

<None listed>

2.13 Historical Preservation

How important is it, in your opinion, to restore Building 170 (a historic structure) according to Federal and State historic preservation guidelines? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
			3	1

Please list the top 3 features of the building that are most important to preserve, in your opinion:

- Exterior structure of the building
- Windows, doors and paint

2.14 High Quality, Productive Workplace

How important is it, in your opinion, to renovate Building 170 into a high quality and productive work environment? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
		1	3	1

Please list the top 3 features of the project that are most important for a high quality and productive workplace, in your opinion:

- Natural lighting
- Fresh Air
- Adequate light
- Proper temperature that is controllable – i.e. can open windows
- Adequate plants, open space

Section 3: *Background Information*

3.1 *Project Involvement*

What roles do/will you play in the Building 170 project? Please describe how you are presently involved with Building 170, or how you will be involved in the future:

- kibitzer; transfer lessons learned to other installations
- No involvement
- Involved in reviewing project documentation for obtaining project approval and providing assistance in obtaining necessary funding for this project.
- Project approval
- None, hope to be a tenant there as part of Env Branch

3.2 *Organizational Affiliation*

With which company, organization, or division are you affiliated?

- FORSCOM
- HQ FORSCOM Engineer
- US Forces Command, Engineer, Chief, Support Branch
- FORSCOM Engineer, Support Service Branch
- FORSCOM ENV BR

3.3*Other Comments*

Is there anything else you would like to say about the Building 170 project, site, or context that we have not addressed in this survey?

- I'm not sure where you're going with this survey...

Fort McPherson Building 170
Stakeholder Group Interview Guide
FORSCOM Personnel

Note: This guide serves as an agenda and checklist for facilitation of a two-hour group interview session. Approximate times are provided as an aid to organization of the session.

Agenda

9:30 PM – 9:50 PM	Part A: Welcome and Introductions
9:50 PM – 10:20 PM	Part B: Facility Priorities, Policies, and Objectives
10:20 PM – 10:30 PM	Part C: Project Resources and Constraints
10:30 PM – 11:15 PM	Part D: Project Objectives
11:15 PM – 11:30 PM	Part E: Future Plans for Facility Sustainability

Part A: Welcome and Introductions (9:30 PM – 9:50 PM)

Thank you for taking time from your busy schedule to participate in this meeting!

Introduction of **Georgia Tech Project Team**:

- Sheila Bosch – Facilitator
- Annie Pearce – Rapporteur (will be taking notes as we go)
- Corey Fischer – Timekeeper and Flip Chart Master (will keep us on track and document on flip charts what we discuss)

Session documentation will be conducted in three ways:

- Via transcript (Annie will be transcribing as we go)
- Via video (Annie will create a video of the session for later review to double-check the transcript)

- Via flip charts (Corey will summarize what we discuss on flip charts so you can double-check what we talk about as we go along)

Does anyone have a problem with being videotaped as part of this session? (Hopefully not – reassure them that the reason for video is as a backup to validate the transcript. We should also try to find out if they have any problems with being personally identified, since we can keep the transcripts anonymous if necessary).

Background to the project/Reason for this meeting:

As you all are aware, Building 170 is rapidly becoming the most researched building in all of the Army's inventory ;-). Some of you participated in the Sustainable Design Workshop this summer to generate ideas for the building's renovation, and there were a lot of good ideas that came out of that meeting.

Since then, Georgia Tech has been asked by the Army Environmental Policy Institute to take another look at the design ideas that resulted from that meeting, and to see if any improvements could be made to further increase the sustainability of the project. One of our tasks is to talk with different stakeholders for the project and document their objectives and constraints related to the project. That's why we're having this meeting today. You are one of five groups of people we'll be talking to, and we hope to get some ideas from you about who needs to be included in the other groups as well.

Given the role of FORSCOM in this project, we're particularly interested in understanding **how the knowledge gained in this project will be applied in future projects**.

Here's how the session is going to work. Please have a look at the agenda for the meeting today (refer to flip chart). We're going to start by talking about your roles and responsibilities in the project, followed by a discussion of your responses to the questionnaire you all received last week. I hope you all brought your questionnaires with you. If not, we'll collect them from you after the session today.

After we go over the questionnaire, we'll talk about policies and procedures that affect the Army's approach to capital facilities, followed by a discussion of other buildings you'd like to be able to analyze in the future for sustainability improvement opportunities. Afterwards, we'll collect your questionnaires and any other information you recommend to us.

Any questions?

Before we get started, there are a few **rules for today's session**:

- Only one person should talk at a time
- Please make an effort to speak loud enough so that everyone can hear you
- Feel free to ask questions or bring up anything that comes to mind as we go along

OK, now let's find out **who you are**. We're going to go around the room and have you introduce yourselves, telling us what you do and what your specific roles are with respect to the Building 170 project. Please tell us:

- Your name, title, and affiliation
- Your job responsibilities
- Your role in the Building 170 project

<Round robin on roles and responsibilities – be sure to thank each person>

Part B: Facility Priorities, Policies, and Objectives (9:50 PM – 10:20 PM)

The next topic is the Army's viewpoint on capital facilities. We're going to talk about three things here:

- How the Army sets **priorities** for its facilities, including allocation of funding
- Army **policies** relating to installations and capital facilities
- Overall **objectives** the Army has for its installations and capital facilities

Note: this part of the interview will be conducted as a semi-structured discussion. For each question, be sure to ask if documentation exists that would provide more information.

1) How does the Army set priorities for its facilities?

- How is funding allocated among projects?
- How has it been/will it be allocated for Building 170?

- Who decides which projects get funded?
- Who decided to fund Building 170?
- What are the criteria they use?

2) What policies exist to define the Army's practices for installations and capital facilities?

- 5.0 What is the role of installations and/or capital facilities in achieving the Army's mission?
- 6.0 How does the Army see this role changing as part of its transformation to the Army after next?
- 7.0 Is there any documentation that describes the Army's policies for installations and capital facilities?
- Is life cycle costing standard practice in making facility-related decisions? What other analysis methods are used?
- How is maintenance money allocated to installations?
- Who decides which organizations occupy which facilities? What process is used?
- How much influence does the Army have on Congressional-level decisions such as BRACs? What has the Army done in the past to try to influence such decisions, and how well has it worked?

3) What are the Army's overall objectives for its installations and capital facilities?

- What direction is the Army headed in terms of creating installations for the Army after next?
- What will Army installations and buildings look like 20 years from now?

Part C: Project Resources and Constraints (10:20 PM – 10:30 PM)

Note: the following questions are listed in rough order of priority. Questions indicated by an asterisk (*) will be asked as time permits.

The next two parts of the session are going to be structured mostly as open discussion. We've got questions for you about the resources, constraints, project team, and other details that pertain specifically to this project. As we go along, we'd like you to think about any documentation, either project-specific or general Army policy, that would be useful in supporting your answers to these questions. Please let us know as you think of anything, and we'll make a note so we can review the documentation later.

This next part of the session is aimed at helping us determine the **feasibility** of recommendations we'll be making to AEPI. We need to know what resources will be available over the life cycle of Building 170. We don't want to recommend any technologies that will not be maintainable or that will cost too much to operate or replace. We hope you can give us some guidelines on how to make these determinations. We also want to rule out any recommendations that conflict with other Army requirements such as standards, codes, regulatory requirements, or other official policies.

Budget Issues:

- How much money will actually be available for renovating Building 170?
- How much money will be available for operating and maintaining this building?
- What is the commonly accepted payback period that's used to evaluate alternatives for built facility investments?
- Are there any other budget-related constraints at ANY phase of the life cycle that we should be aware of?

Other Resources and Constraints:

- What, if any, formal codes, regulations, or standards apply to this project?
- Are there any official policies of the Army that should be considered in evaluating recommendations?
- Any other thoughts on resources or constraints that we should know about?

Part D: Project Objectives (10:30 PM – 11:15 PM)

Note: The items in this section correspond to questions from the written survey completed by the group prior to the meeting. Questions have been reordered to permit those questions with most discussion potential to be covered first. If time permits,

questions marked with an asterisk (*) will be covered. For most questions, a flip chart list will be made of the responses, and participants will be asked to vote for those items they believe are most important. Voting will be done by giving each participant three sticker dots per question, and allowing them to allocate those stickers to questions to reflect their importance.

1) Overall Project Objectives

(corresponds to survey question 1.0)

What did you list as the top 3 objectives for the Building 170 project that must be met in order for the project to be considered a “success”? Are there any other objectives you think should be included in this list?

**<List of Overall Project Objectives;
Have them choose top three via votes (sticker dots)>**

2) Embodied Environmental Values

(corresponds to survey question 2.1)

One of the objectives identified by AEPI is to have the building reflect the environmental values of the Army. What environmental values do you think the project should exemplify? Are there any other values you think should be included in this list?

**<List of Environmental Values;
Have them choose top three via votes (sticker dots)>**

3) Demonstration of Cutting Edge Technologies/ Sustainable Construction Practices *(corresponds to survey questions 2.3 and 2.4)*

What did you list as technologies or sustainable construction practices that should be considered in this project? Are there any other technologies or practices you think should be included on this list?

**<List of Cutting Edge Technologies/Sustainable Construction Practices;
Have them choose top three via votes (sticker dots)>**

Did you list any concerns about using cutting edge technologies? Are there any other concerns you think should be included on this list?

<List of Concerns;

Have them choose top three via votes (sticker dots)>

4) Control of Life Cycle Costs

(corresponds to survey question 2.12)

What did you list as worthy investments to control life cycle costs? Are there any other items you think should be included on this list?

<List of Life Cycle Cost Investments;

Have them choose top three via votes (sticker dots)>

5) High Quality, Productive Workplace

(corresponds to survey question 2.14)

What features did you identify as being important for a quality workplace? Are there any other features you think should be included on this list?

<List of Workplace Attributes;

Have them choose top three via votes (sticker dots)>

*** Historical Preservation**

(corresponds to survey question 2.13)

What did you identify as being important to preserve from a historical standpoint? Are there any other features you think should be included on this list?

<List of Features for Historical Preservation;

Have them choose top three via votes (sticker dots)>

*** Control of Project First Cost**

(corresponds to survey question 2.11)

What did you list as project cost drivers? Are there any other items you think should be included on this list?

**<List of Project Cost Drivers;
Have them choose top three via votes (sticker dots)>**

*** Lessons Learned**

(corresponds to survey question 2.5)

Anything about lessons learned that you want to discuss?

Is a system already in place to capture lessons learned? If so, what is it like?

Do you formally use lessons learned from other projects as part of your job?

*** Executive Order Compliance**

(corresponds to survey question 2.2)

Which EOs did you identify as being important? Why or why not?

Discussion of overall feeling on the importance of EOs.

*** Traffic Congestion**

(corresponds to survey question 2.6)

What did you list as measures to be taken to manage traffic congestion? Are there any other measures you think should be included on this list?

<List of Traffic Congestion Measures>

*** Air Quality**

(corresponds to survey question 2.7)

What did you list as measures to be taken to manage air quality impacts? Are there any other measures you think should be included on this list?

<List of Air Quality Measures>

*** Water Quality and Supply***(corresponds to survey question 2.8)*

What did you list as measures to be taken to manage water issues? Are there any other measures you think should be included on this list?

<List of Water-related Measures>

*** Urban Sprawl***(corresponds to survey question 2.9)*

What did you list as measures to be taken to manage urban sprawl? Are there any other measures you think should be included on this list?

<List of Urban Sprawl Measures>

*** Economic Development***(corresponds to survey question 2.10)*

What did you list as measures to be taken to encourage economic development? Are there any other measures you think should be included on this list?

<List of Economic Development Measures>

Part E: Future Plans for Facility Sustainability (11:15 PM – 11:30 PM)

Note: This section will be conducted as an semi-structured open discussion along the lines of the listed questions.

We're in the home stretch now. We have a few final details to clear up, primarily dealing with how the Army plans to proceed with its sustainability efforts in the future.

One of our goals for our study is to demonstrate a method for identifying ways to improve the sustainability of facility projects. We hope that this method will be useful for future Army projects beyond Building 170.

- What kinds of projects are most likely to be considered for sustainability analysis? Why?
- Who will be involved in trying to implement sustainability for those projects?
- What other efforts are underway now relating to sustainable facilities and installations?
- Where in the project delivery process is sustainability most likely to be considered?
- What would it take to get additional funding allocated for sustainability projects (if necessary)?
- Who would be most likely to conduct sustainability analysis for future projects? Installation personnel? Design/USACE? Contractors?
- What can we provide them in terms of tools and guidance to make their job easier?
- What will have to happen at higher levels of the Army hierarchy to promote implementation of sustainability?

Fort McPherson Building 170

Stakeholder Group Interview

FORSCOM

This is the transcript for Session 2: Group Interview with FORSCOM Personnel. Date of the session is 31 January 2001. See interview guide for additional information on the structure of the session. Session conducted by Sheila Bosch, Corey Fischer, and Annie Pearce. Session participants included Michael David, Nuthu Kumar, Ray Stoudenmire, Jim Cobb, Mannette Messenger, and Adrian Gillespie. Dave Barber and Beth Grashof also joined the session to lend their perspective, and additional FORSCOM personnel joined and departed the meeting as available.

9:30 – 9:50

Welcome and Introduction

Introduction of Georgia Tech Team. Introduction to the project:

The project we're doing involves working with AEPI to renovate Building 170 so they can move into that space. Their intent is not only to make the building historically appropriate, but also a sustainability showcase for the Army. Was anyone involved with the Southface charrette? They brought in experts from different fields to come up with ideas and solutions to make this a truly green building. AEPI has asked us to look at Southface's recommendations and try to improve the sustainability of the building that would result from implementing those recommendations.

Our primary interest in talking with FORSCOM is not only to find out information that pertains specifically to this project, but also how can we make our work more generalizable to the Army at large.

Discussion of agenda; rules for the meeting; introduction of participants.

Michael David – budget analyst; handles money and works for Ray. Attended some 170 meetings and has ideas about the funding and cost requests; knows how much has already been spent and what else they need. Does not know where the remaining money is. There is a process to go to ACSIM DA and resource management to get more money. There is a process to keep going higher to look for money.

Mutu Kamar – operations, engineering support branch. Primarily involved in project approval. Any projects that require approval from installation level get approved here and then sent to headquarters. This project was approved for \$3.3 million on 24 July. Only the roofing money has been acquired.

Ray Stoudenmire – Mr. Clark has assured us numerous times that the money will arrive; however, only the roof money has arrived to date. We're optimistic. Ray is the head of support branch at FORSCIM Engineering. He deals with work policies, energy, funding, logistics, and other things. Building 170 is one of the projects they've been involved in.

Jim Cobb – Environmental office. Jim deals with cultural resources, but not with specific buildings – that's Beth Grashof's specialty. Rather, Jim deals with overall programming. He is sitting in for Mike <did not catch name>. Has not attended any other meetings on

the Building 170 project. Have deferred to Beth. Didn't attend the charrette either. Not that familiar with the building, but interested in hearing more.

Mannette Messenger – with the Environmental branch at FORSCOM. Lots of pollution prevention interest. Green building demonstration facilities are of interest due to their lack of environmental impact. Started a competition among installations to see who can get a green building built first. This is an exciting project, and we're very interested in having AEPI move here so we can work more closely with them. No direct involvement in the project.

Adrian Gillespie – support branch – handles energy program, utility privatization. Knows where Building 170 is, but no other involvement.

Facility Priorities, Policies, and Objectives

{GT} How is funding allocated among projects?

{group} The introductory questions should have given you some insight. This project was given money from above, which is *not* typical.

At the installations level, DPW gets work orders and identifies projects from inspections. They estimate costs and set their own priorities. How they set priorities is installation-specific, based on mission requirements and other things.

In some cases, there are empty buildings that need to be filled, and people who want to come on post. It's a function of where the money will be coming from, and specific requirements.

The Fair Share model is used by DOD (was built by FORSCOM) and has an inventory for all facilities reported by installations. The model captures information about facility inventories and classifies facilities into 5 groups: Mission, Training, Administration, Housing, and Maintenance/Support.

They're divided according to use. AR-438 says more. There's another system called installation status report into which all facility information is input each year. Facilities are rated C-1 through C-4 based on condition. C-1 is good condition, and a lower rating means it needs more work. C-4 is a red building, in the worst condition. Projects are used to improve the condition of the facility and bump it up (red, amber, green).

A contractor runs the model for FORSCOM and provides an annual estimate of maintenance requirements, which gets sent to HQDA. This is what they need to maintain the facilities. This request goes to Congress and money is allocated. The money is then allocated to the MACOMS (whatever Congress gives) and is then allocated among projects. If there's not enough money, it is distributed among installations according to the Fair Share model. They get whatever is available. The installation priorities are derived from commanders, and the real property planning board meets every quarter to review the list of facilities and their needs. This group allocates the money given to the installations based on their own priorities. The commander is involved, along with all other parts of the installation represented on the planning board. They decide what projects will proceed. The DD1391 can be prepared and design done, but then it's shelved until money arrives. Mid year, there's another search for money. The commanding general has authority to influence the basic priorities set by Fair Share. If

his priority is training, then he can allocate more money to training-related projects. Whatever his priority is, he can overrule the defaults in the funding process.

[Building 170] came by a different route. The Deputy Secretary of the Army came and decided that they wanted this as a green building. It might be ranked low using the standard prioritization process, and might take ten years. But if higher-ups get involved, even higher than the commanding general, they can bump up the priority. But they haven't come through yet with the money.

{GT} Does this only apply to MCA projects? Major construction?

{group} Dave Stous (?) handles different pockets of money. Major renovation projects are included in this process. There's a minimum dollar threshold - \$500,000.

{GT} Do we need MCA money for Building 170?

{group} No, just operations and maintenance money. OMA stands for "Operations and Maintenance Army".

This money was promised by a political appointee from a previous administration. He may not survive in his former capacity, and may not be able to come through with the money. This may set us back. It depends on the power and interests of the new appointee.

We have the other option to go through the normal process, and if the Commanding General backs it, then it may get done sooner.

{GT} Who's paying for the renovation? Did Ray Clarke pay for it?

{group} Yes, \$500,000 was provided at the end of the fiscal year to do the roof. Then they were told that they could not cover the rest, so they told Fort Mac that they'd have to submit a request for more funding.

Note: UFR stands for "unfinanced requirement".

{GT} When do you hear if you get money?

{group} End of the fiscal year. It goes through <someone> upstairs, who talks to commanding general. If he approves, then it goes up to headquarters based on priorities. If it gets high on the list, then it has a good chance of getting funded. The CG sets the priorities for projects. Whether it gets funded depends on how much money the DA has to give back, and who supports the project.

If we use the normal project process, the priority is set here. When it is supported by higher-ups, they get to set the priority.

{GT} Who is presently supporting the project?

{group} The CG's opinion is presently unknown. He knows about the project (and has met Clarke and Apgar), but they haven't necessarily pushed the project from here.

The McPherson commander (COL Cooney) could go up the DCG to request funding, since this is part of his real property inventory. It's his responsibility to get the project done. The UFR would originate with LTC Abernathy. We were assured a few months ago by Apgar and Clarke that the money would come through, but it just hasn't appeared yet.

{GT} When might it arrive?

{group} Midyear review is in February, during which all UFRs are gathered for all projects. They screen them, and then come up with a list. Ms. Jeffries upstairs approves the list and then sends it forward to the DA to request money for completion. The DA has their own process for deciding how much of the list gets funded. It takes about a month to figure it out. They go to Congress in April to get supplemental funding. Requests are submitted from MACOMs to Congress defense committee who reviews it and decides how much money is going to be distributed. It first gets distributed among the services, then down the steps. It has an April timeframe.

{GT} What chance would this UFR have?

{group} We have no idea. It depends on Col. Cooney's rating of importance of the project., and how much politics are involved. The Asst Sec of the Army (ASA) is involved, so it is interesting. But there was a change in administration, so who knows? We're optimistic, though.

The mission at Fort McPherson is to provide space to tenants, not training or some other mission. The buildings are very important to the mission and therefore get a lot of attention. The UFRs generated here, though, must compete with UFRs from other installations.

{GT} How do capital facilities help to achieve the Army's mission at large? What's the role of installations in achieving the Army's mission?

{group} It varies by installation. Some are training, some are TRADOC that have specialized schools. Fort McPherson is HQ, and their mission is to provide space. Some provide R&D, e.g., Aberdeen. That's a different MACOM. FORSCOM tends to focus on training active duty soldiers. TRADOC, in contrast, breaks them in with initial training and specialized training like special schools. Materiel command (AMC) focuses on manufacturing and weapons.

{GT} Do you anticipate the role of this installation to change in the future?

{group} There's going to be another BRAC round in 03-05, but it has to be approved by a Congressional committee. We all know how Congress likes to close installations.

{GT} Any other documentation we should look at with respect to installations?

{group} There are two thousand documents that describe regulations and missions, that goes down to the brigade, platoon, companies. As far as capital facilities, there are environmental regulations, including the AR-420 series on engineering. There's another series on money/budget, and one on historical requirements.

Look at ACSIM's web page to identify applicable regulations. ASAFM – ASA for financial management might be of interest.

{GT} What about life cycle costing? Is it included in decision making?

{group} At the highest level (ASA), they need to see LCA before they approve the project (> \$3 million projects). They need to see economic analysis – mil con/MCA projects. MCA has a separate pot of money different from day to day operations and maintenance projects that can be used for life cycle investments. There is a standard

process as part of DD1391 to do it. The cycle is typically 25 years for analysis. The documentation that goes along with the DD1391 is cost analysis. It's not typically full-blown in renovation projects like this.

Econopak is a model that gives you the whole LCA. Installations feed their data into this system to do LCA and generate their 1391 LCA requirements.

{GT} Who decides which Army organizations get located where?

{group} The DPW on installations (or Direction of Installations support – real property manager). They use space studies to keep track of needs.

{GT} How much influence does the Army have on Congressional-level decisions like BRAC?

{group} There's a 4 star general at the FORSCOM level who has a lot of clout. This 4 star is involved with training, active Army, Reserves, etc. FORSCOM is the Major MACOM. FORSCOM has 11 installations in different states. Each state has its own Congressmen who are defending their installations. When Sam Nunn was our senator, Georgia didn't lose any installations at all. These Congressmen have a strong voice in what gets closed. The installations are important to the economy, so they try to defend them.

{GT} What will buildings/installations look like in 20 years?

{group} Depends on who you ask. The Army is in the process of trying to eliminate all World War II facilities (temporary). They're trying to use master planning to bring all facilities up to a certain standard that are compatible with each other. There's a residential communities initiative (RCI) that will change the landscape a lot. The federal government is in the mood of outsourcing and privatizing many of its processes, and the Army is no exception – utility systems, services, etc. We hope this will improve the state of the art for Army facilities, and make them greener.

There's an Army policy that tells installation commanders they can save buildings (e.g., World War II temporary facilities) if they are needed, but they have to show energy performance, cost analysis, and other information to support it. It has to be approved by ASA. There are restrictions on how many facilities can be torn down. There's also a stipulation that you have to demolish a certain amount of square footage before you can build new facilities.

Project Resources and Constraints

{GT} How much money will actually be available for the Building 170 project? The whole \$3.3 million?

{group} We're optimistic that it will come through. This includes roof, demolition, etc.

{GT} How is OMA money allocated?

{group} Installations allocate it based on condition inspections. There's never enough money. If they get a new mission and need new space, up to a certain degree they can use OMA money for that. There is data available to estimate operations and maintenance

costs for every building the Army has. It's not tied to exact money, though, because we don't have good ideas about how much money will actually come through. Could be 40%, 60%, whatever percent of what is actually requested. Never 100%. You're always working with less.

{GT} Do estimators artificially inflate budget requests on 1391s to compensate for this?

{group} Project budgets don't get inflated, projects just get mothballed. It's at the Commander's discretion to determine how the UFR list is prioritized. It may have nothing to do with actual requirements. Everybody is lobbying to the Commander – the squeaky wheel phenomenon. Depends on risks perceived by the commanders. They also want to look good to people higher up. Lots of politics.

{GT} What's the standard payback period?

{group} For energy projects, 4 or 5 years. Depends on what you're doing. Different systems have different paybacks. ECP program – energy conservation program – won't look at anything with > 10 years. Looking at HVAC, if the life expectancy is 5 years but the payback is 10, then it's infeasible. Depends on the system, depends on the project. Roofing systems like slate are 100 years, so those are very different.

Analysts do cost avoidance and savings analyses, but how much success they have in actually getting money is still up for grabs. This is the challenge on a daily basis. The difference between how much money is needed and how much you get has to be made up somewhere. It will require a change at the installation level, the MAJCOM level, the ASA level. It will have to be a paradigm shift in the way that projects are reviewed, funding requested, and money handed down. There's too much cyclic routine replacement without any analysis of what's actually failing. It's not necessarily economically feasible. This is where the paradigm shift comes in – you start using better materials, getting rid of between-resident painting, etc. Paint gets really thick, and it's not necessary. You could simply wash the walls and do touch-up painting. Or storm windows – you get a low bid, but they fail after a year or two. The paradigm shift has to come in at getting not just the low bid and regularly replacing low quality crap, but focusing on higher quality products with greater long term returns.

The mindset is that there's never enough money, so you rob Peter to pay Paul and scrounge, and go after low bid, and there are regulations that not only encourage but *require* this mentality. The procedure will have to change to allow you to accept bids on a quality basis, not just quantity. There are procedures to let you select on a quality basis, but they are not the most expeditious. People take the easy route.

With cultural resources, they follow the Park Service method and can specify based on quality. Hopefully changes in the FAR will make it easier.

{group} The design of this project will be done by the installation, not USACE. Mike and Beth, mainly.

Note: at this point, a question was raised about the transcript's availability for review. It was noted that approval of the transcript content will be required, along with limits on its distribution.

Project Objectives

Note: this section was saved for last since it has already been covered in the questionnaires. Due to time constraints, we did not cover it in the course of the meeting.

Future Plans for Facility Sustainability

Note: this section preceded *Project Objectives*, in the interest of ensuring that these questions were answered before running out of time.

{GT} What kinds of buildings would this kind of study be useful for?

{group} Administration buildings. At FORSCOM installations, there are many buildings that this could be applied to. There are many historical buildings that could apply the same approach that was done here. We don't have an exact inventory.

We'd want to apply the process to a permanent building, not temporary, and one that is projected in the master plan to be around for at least 10 or 20 years, not slated for demolition. Want to look at substantially built buildings, e.g., stone, brick, block, etc. Definition of "permanent" is concrete, block, etc.

{GT} Does there need to be a distinction between historical and other buildings?

{group} We don't need to, because historical can be part of green. Also, for the time frames we're talking about, existing facilities may end up being historical within the time frame.

Note: at this point there was a comment on historical buildings and costs, followed by a vehement dissent that they don't have to cost more.

{group} The key of all of this is to integrate it into the planning process. You can integrate sustainable development into historical structures, new construction, wherever. You have to rewrite the installation design guides and change the attitudes of command on post. Also maintenance people.

{group} With respect to the money approval process – if the project exceeds 80-90% of the cost of the whole building, you have to get approval from Uncle Sam to do the project, since it might be less expensive in the long run to simply rebuild the building. Anything that exceeds 50% of the replacement costs also has to get approval. Most people are not willing to run this gauntlet, and just try to keep costs below these thresholds. If you want to do something right, you will have to make the effort to overcome this barrier.

{GT} Who will be the key players?

{group} Funding folks: (RM) – resource management people. It will have to be a total team effort, from the MACOM to installation level to really make it work. If it starts with funding, then the funding people need to know about the installation's attitude toward projects, what they're likely to request. Otherwise, they won't understand when an unusual request comes through. Need to bring these people on board so they can see the big picture. Make them a part of the process. Have to sell what the installation is trying to do.

{group} With the Fair Share model, you can click a button and get a worksheet to tell how much money is needed to sustain all the facilities at the current installations. If you only get a part of this money, then that is the minimum needed to sustain the facility. There's also a backlog from previous years, which requires additional money each year to try to offset it. Annual Recurring Requirement is how much is needed just to sustain the facilities, plus an amount to offset the backlog.

{group} There is a distinction between sustainment and sustainability. Sustainment is meeting mission requirements, remaining operational, etc.

{GT} Are there other Army efforts relating to sustainable installations?

{group} Facility Strategy Program – Department of the Army is working on it. Gave input from FORSCOM 2 weeks ago – condition of facilities, financial requirements, etc. are used to generate a 15 year facility strategy to give to Congress. ACSIM is doing this. Information comes out of the installation status report. Buildings are rated C1 – C4, and a plan is generated to upgrade facility conditions over the next 10 years. The quality of the information (especially environmental) is questionable.

{GT} Where in the project delivery process is sustainability most likely to be considered?

{group} Planning is critical, as is the project design phase. Actually, sustainability is critical throughout. You have to have a proponent, for example the Commanding General, who knows it's important and wants to see it succeed. He has to understand what you're trying to accomplish, and that may require selling and education.

{GT} What would it take to get additional money if needed?

{group} It's not a good idea to call it "additional funding for sustainable design". Say we're requesting funding to maintain or build. You'll have to prove that the sustainability improvements save money in the long run. We need more life cycle costing than we presently do. The notion of integration of the idea of sustainability into the process – have it be a natural piece, not an add-on. It's going to be difficult from a sociological standpoint.

{group} Education will be necessary – educating engineers and designers about systems, techniques, getting them to expand their design vocabulary so that these things (especially stuff like HVAC) can be understood and considered and incorporated. That involves fine tuning of systems within the building and understanding how they contribute to the sustainability of the facility as a whole. When you're looking at modeling, need to promote sustainable design. It's a critical part of the equation along with demonstration and education.

{group} Need to change people's mindset about dealing with different systems so they know how to design it, maintain it, fix it. How much more will it cost? Once we've gotten over the hump of letting go of how we always did it, then we might succeed. Education is needed at all levels. Georgia Tech provides training, as does USACE. AEPI could also come into the process with support, promotion, and development of training.

{GT} Who might be most likely to conduct sustainability analysis on other projects?

{group} USACE would handle it through the DPW on an installation. Could also be handled by a master planner working with engineers on post. It will start with DPW/DIS.

It's called DIS here since it's combined with logistics - Directorate of Installation Support.

{GT} What can GT provide to make it easier to incorporate sustainability in the process?

{group} The tools are starting to show up in the market, e.g., LEED. The mindset and shifting of attitudes is where the payback can be found. It goes back to education. Software is nice, but if people have the wrong attitude, these tools will not be used, or not be used effectively. It's the toad in the road syndrome. The attitude is to keep using stuff if it seems to work. Doesn't matter if the electric meter is spinning like a top. People don't want to learn. Sustainable design and development is important for this project, but the process, implementing it, is what's more important.

{GT} Any recommendations for higher-ups to promote sustainability?

{group} Tell them to put their money where their mouth is.

{group} The charrette was extremely useful for introducing new ideas to people who weren't already familiar with them. The interdisciplinary team approach was good, everyone being able to contribute to every aspect was good. Incorporating that idea would be helpful. The higher levels need to promote this, maybe put together guidance on how to do it or have a SWAT team to go out and help.

{group} When you're trying to sell this at the higher level, it all revolves around money. The backlog of maintenance, the sustainability of the installation in general is going to have to do with money. How we get there will have to reflect how the installation can save money in order to sell the concept to higher ups. If that's through long range economic analysis of the systems, or through some other means of showing economic benefits, that's what it will take to budge us from the status quo.

{group} Money is the one tangible thing that we have to link it back to. That's the only driver. The only way there will be other drivers is if HQDA says there will be. Ray Clarke needs to follow his statement of "this will be a green building" with "and oh yeah, here's the money".

{group} You can't just look at the first cost of the building, you have to consider life, health, environment, habitability, safety, etc. These have to be factored in. These are factors. When you're selling it higher up, you have to sell it on the basis of economics. (Note: these things can be factored in).

{group} If a building needs to get built, it will, no matter what the budget actually provides. Corners are cut. We need to be willing to say NO, the building won't get built without the money because it can't be done effectively. Reality is that we cut corners, such as quality of life and safety issues, which results in sick days, low staff retention, and other ill effects. There are other ways to capture what's going on. This building would be more healthy if the fresh air exchange rate were increased, but it takes an act of Congress to get it done.

{group} There has been a nice directive signed by all the right guys, but it doesn't include a standard of how it will be implemented or measured (unlike the specification of LEED Gold by the Navy). We need to *not* fund things that don't meet the standard.

{group} When you do O&M projects, portions of it consider classification of work. Certain upgrades are allowed to the projects. They get \$500,000 per year to use for these things, to address problems. If problems involve life safety, you can get up to \$1 million to fix them. This is the “L” account and comes from the O&M budget. ACSIM has a total of \$3 million. If it requires more than this, it has to go through ASA. If it’s more than \$7 million for one project, then it has to go to Congress.

Conclusion

{GT} We’re out of time – can’t do rating, but that’s ok – we’ll get these from the sheets. Is there anything else you think we should know about?

{group} As far as the design is concerned, the final design has not been accomplished.

{group - discussion} How will the findings from this study be incorporated? At this point they will probably not be.

{group – Garrison people} At the installation level, we did the voting things and some of that stuff will be incorporated. Some important issues were uncovered at that interview that may be incorporated.

Note: Beth sees this process as being helpful in setting policy and providing input to higher levels about how to change policy. The charrette outputs from this summer had direct input into design.

<END>

FORSCOM Stakeholder Interview

SFI Staff Notes

PART A: WELCOME AND INTRODUCTIONS

Michael David

- Budget analyst
- Knows about cost estimate, past spending and future money for project
- Does not know where the money is now

Muthu Kumar

- Works in Engineering Support Branch
- Involved in project approval
- Project was approved by ASA on July 12, 2000 for \$3.3 M but only got money for roof work (\$600,000)

Ray Stoudmiere

- Head, Support Branch
- Branch works on energy, money, project approval and logistics of the project

Jim Cobb

- Environmental office, cultural resources (not building related)
- Has not attended other Building 170 meetings
- Not familiar with building but interested in the project

Mannette Messenger

- Environmental Branch, FORSCOM
- Looking at environmental issues
- No direct role in the project

Adrienne Gillespe

- Energy program
- Utility privatization

PART B: FACILITY PRIORITIES, POLICIES, AND OBJECTIVES

1. How does the Army set priorities for its facilities?

- DPW inspects buildings and inspectors generates work orders
- DPW sets priority at installation level within their own priorities and mission
- DPW uses a fair share model established by FORSCOM
- The fair share model has an inventory of all facilities for all installations that report to FORSCOM. The model sorts buildings into 5 categories: administrative, training, mission, *, and * (415-38 is the Army guide telling the different types of buildings). A contractor runs the model to determine requirements to maintain facilities. FORSCOM then passes funding requirements onto HQ DA. HQ DA gets funding numbers from all other MAJCOM HQ which they then submit to congress. Congress gives funding to DA HQ. DA HQ then gives money to MAJCOMs. MAJCOM gives money to installations based on percentage of money received versus percentage of money requested. At the installation level, the garrison-level commander prioritizes money.

2. How has money been allocated for the Building 170 project?

Ray Clark, assistant secretary, came and visited the installation and wanted to endorse project. Needed Army O&M money (OMA). A UFR (unfinanced request) was submitted to cover the cost of the project. Col. Cooney is the Ft. MacPherson UFR contact. All UFRs at the installation level are submitted to FORSCOM. UFRs are prioritized by DA and then they compete against all other FORSCOM UFRs. There is a mid-year (February) review of all UFR's from installations under FORSCOM. SCS prioritize the list at the end of February or the beginning of March and then forwards it to the higher-ups. The final list goes to Congress (Defense Committee) in April for supplemental funding. Congress then goes to OPM to get the money.

3. Is Life Cycle Analysis typically used?

For project greater than \$3 million, ASA must see "economic analysis" which includes LCA. It uses a 25-year cycle. Part of the DD 1391 process is cost analysis which is not a "full blown" LCA. "Econopak" software is used for cost analysis for the DD 1391 form.

4. Who decides which tenants will move into a building?

The DPW which is called the Directorate of Installation Support (DIS) at Ft. MacPherson.

PART C: PROJECT RESOURCES AND CONSTRAINTS

- Expect to get \$3.3 million. Need \$3 million for all work (excluding roof and demolition which already received \$600,000 for)
- Work on a 5-year forecast budget. There is not much control of what percentage of money you get of what you asked for. You never receive 100% of funding requested.
- Garrison commander has control of UFR requests. Personal preferences get involved, as he/she has to consider upper-level requests.
- There is not a commonly accepted pay back period for built facilities. The pay back period changes depending on each project. The maximum pay back period is 10 years. If it is over that the project won't even be looked at.
- Need attitude change at installation level, MAJCOM-level and DA-level to involve sustainable design and development into the mindset.

PART E: FUTURE PLANS FOR FACILITY SUSTAINABILITY

- Design will be completed at installation level
- What kinds of projects do you think this process could be applied for?
 - MAJCOM historical buildings (there are many of these)
 - Administrative buildings
 - Permanent buildings (not temporary or semi-permanent)
 - Concrete, stone and brick buildings
- The key is to integrate into the planning process – both historical and new. Need to rewrite installation guides, change the mind set, attitude and funding processes.
- Who are the key players to getting sustainability implemented on projects?

All levels from installation to MAJCOM

- Need money to both “sustain” facilities at current levels (ARR – Annual Recovery Requirements) and to cut back log
- Facility strategy program (new program started at Army level). Installation Status Report (ISR) at MAJCOM
- Where is the project delivery process is sustainability most likely to be considered?
 - Project planning, design
 - Critical throughout
 - Need support in garrison
- What would it take to get additional funding allocated for sustainability projects?
 - Educate designers and engineers to expand design vocabulary
 - Do not say “more money for sustainability projects” – it is just money for projects
 - Need to focus and sell sustainability on it’s economic savings
 - Need to fine tune LCA
- Who would be most likely to conduct sustainability analysis for future projects?

Needs to come from installation level. The Corps will do it coming in through the installation level (DPW).

- What will have to happen at higher levels of the Army hierarchy to promote implementation of sustainability?
 - They need to put money where their mouth is
 - Charrette was useful in educating. Need a “SWAT team” to help installations get the charrette process going.
 - Inter-disciplinary work is good
 - DA needs to set standard and stick to it. There is a sustainable development policy but there is not guidelines/standard as to how to implement it
 - Corps has taken first step by “sending around” sustainability training

- AEPI needs to come and support development of training

OTHER FACTS

- ISR – Installation Status Report. Buildings are rated C-1 through C-4 (worst condition).
- Another round of BRAC possibly in 2003-2005
- Potential resources of Army regulations/requirements (come from the Army Chief of Staff for Installations)
 - Capital resources – environmental regulations (1 & 2)
 - AR 420 series
 - Series on budget
- FORSCOM has 11 installations in different states and all congressman and representatives lobby for the installation in their state
- Army is trying to eliminate all WWII facilities. They are using master planning to try to make better installations. There is a residential communities initiative (RCI) which is focused on privatization of residential properties within the DOD.
- If project funding is less than \$500,000 then goes under O&M. If greater than \$500,000 the project enters the MILCON process. If project funding is greater than \$3 million but less than \$7.5 million it goes to ASA for approval. If project funding is greater than \$7.5 million it must go to Congress.
- DPW and Logistics are together at Ft. MacPherson in the DIS – Directorate of Installation Support
- Must look at quality of life issues of building including health and safety (i.e. ventilation)

Tab 7

AEPI Stakeholder Protocols and Data

Fort McPherson Building 170**Baseline Stakeholder Survey****AEPI Compiled Results****Section 1: Overall Project Objectives**

Please list your top 3 objectives for the Building 170 renovation project that must be met in order for the project to be considered a “success”, in your opinion.

- Complete the project – do the renovation – even if there are deficiencies, the “lessons learned” are valuable.
- Meets the needs of those people that are impacted by the building – occupants, visitors, maintenance, installation management. Needs = functionality, aesthetics, comfort, resource and energy efficient, low maintenance, long term costs and healthy
- The building is cost effectively adaptable for future use.
- Be a building role model with environmental controls.
- Sustainable
- Good stewardship
- Professional
- Private enclosed office
- Easy access with MARTA
- Comfortable working/office space
- General physical comfort to facilitate working and visiting expert accommodations.
- Relative quiet and decent light to allow concentration.
- Quality, long life construction as an effective use of resources.
- Optimum energy performance: preferably no net energy use from “grid” sources
- Highest quality working environment, demonstrating “best practices” in sustainable design and development (SDD).
- Integrated site planning and building design to optimize water consumption efficiency
- Renovation should create a work environment that maximizes productivity of occupants

- The project should be a laboratory for green planning, design, construction, use and operation and maintenance
- Demonstrate favorable economics – benefit cost analysis and auditing.
- A model for sustainability
- Instructive to newcomers on these qualities (?)
- Cost-effective and replicable elsewhere. Decision-making and review of critical docs (before they become final) is VITAL. We need authority, not just to provide advice.
- Accurate temperature control year around and use of natural sunlight
- Maintaining historical integrity of the building
- The time, effort and money put into this project are use prudently
- Functional
- Energy efficient
- Aesthetically pleasing and architecturally sound
- Lead by example; walk the talk; encourage others to follow our example
- Demonstrate how the white collar office in the 21st century can be best design and configured to promote the best environmental and functional design principles and practices
- Be accurate in the accounting for the true cost of this project (contracts, in-house cost, etc.) so we can demonstrate that sustainable design can be cost effective design over a building life-time. If we are successful others will try to follow our example.

Section 2: Specific Project Objectives

2.1 Embodied Environmental Values

How important, in your opinion, is it to have Building 170 exemplify the environmental values of the organization you represent? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	1	3	5

Please rate the importance of the following environmental values, in your opinion:

	Not Important	Somewhat Important	Extremely Important
Preservation of natural ecosystems <i>*one respondent noted N/A</i> <i>*scarcely issue at the given location</i>	0	2	9
Resource efficiency/waste elimination	0	0	12
Preservation of biodiversity <i>*scarcely issue at the given location</i>	1	3	8
Water conservation	0	1	11
Energy conservation	0	0	12
Improving quality of human life	0	1	11
Equitably meeting human needs	0	3	9
Other: <i>minimized embedded energy</i>			
Other: <i>cost effectiveness/replicability</i>			1
Other: <i>educational capacity</i>			1

2.2 Executive Order Compliance

How important, in your opinion, is Executive Order compliance for the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	0	9	2

Which of the following EOs are important to you regarding the Building 170 renovation? Select as many as necessary.

- 11 EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- 12 EO 13123: Greening the Government Through Efficient Energy Management
- 12 EO 13148: Greening the Government Leadership in Environmental Management

Other (please specify):

- 1 Other *12088 or replacement*

Why is compliance with these EOs important or not important?

- 13101 – for resource efficiency; 13123 – for energy efficiency (which also relates back to resource efficiency); 13148 – building have a long term environmental impact that should be included in management decision-making.
- Can't enforce or criticize if you yourself don't comply
- We walk the talk
- The whole world needs to move in those directions
- These are orders from the Commander in Chief. They are also good business practices.
- Supports Army environmental stewardship and conservation responsibilities. Makes good business sense.
- "Compliance" strikes a chord in other Army builders that may not be as environmentally focused.
- Important because end results if adhered to benefit all
- Unless they are reversed, these EO have the standing as law. Many of these policies and principles are the "right things to do with regards to sustainability and energy conservations."
- We need to have a better system of environmental management and stewardship; we should set the example

2.3 Sustainable Construction Practices

How important, in your opinion, is it for the Building 170 project to become a premier example of sustainable construction practices? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	1	6	5

Please list any measures that should be taken, in your opinion, to ensure that Building 170 becomes a premier example of sustainable construction practices:

- Passive energy input or low input of energy from non-renewable resources; use of resource efficient construction materials; design allows for future adaptation.

- “Embedded” energy needs to be included in calculations on what to remove, replace, change and materials and methods options. And look at a 50 year productive life, not 10-20.
- Hire A&E firm with expertise in sustainable design and construction. Hire contractors with expertise.
- Get funding; engage project manager; contractors; installation and MACOM commanders and service civilians.
- Document eco-advantages as a teaching tool
- Document cost advantages as a teaching tool
- Reuse of building materials, if possible and economically feasible, from WWII wood frame buildings

2.4 Demonstration of Cutting Edge Technologies

How important, in your opinion, is it to demonstrate the use of innovative, cutting edge technologies in the Building 170 project? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	2	6	3 <i>*but not if they aren't cost-effective</i>

**One respondent noted “but what’s cutting edge now may be obsolete technology in the not too distant future”*

Please rate the importance of demonstrating cutting edge technologies in the following categories, in your opinion:

	Not Important	Somewhat Important		Extremely Important
Site and landscape technologies	0	5	0	8
Energy technologies	0	1	0	11
Water-related technologies	0	1	0	10
Cutting edge building materials	0	6	0	6

Technologies for indoor Environmental quality	0	2	1	9
Waste treatment technologies	2	4	0	7

Note: Respondent added extra column

Please list any specific technologies that should be considered for use in the Building 170 project, in your opinion:

- Capability for wireless transmission
- Geothermal/ground source heat pumps; waterless urinals; “living machines” for wastewater treatment
- Light shelves (interior)
- Communication tech (i.e. wireless LAN, UTC facilities)
- Occupancy sensors in restrooms because they are highly visible to visitors
- Porous pavement because they are highly visible to visitors
- Real-time utility metering because they are highly visible to visitors
- Sound insulation and thermal glazing. Air purification system. Water filtration system.

Please list your top 3 concerns associated with demonstrating cutting edge technologies in this project:

- What’s cutting edge now may be obsolete technology in the not too distant future
- Can it be cost effectively replaced with better technology in the future
- Demonstrate what has a chance of being incorporated
- Going with new fads will lead to resource waste.
- Failures with inadequately sharpened cutting edges might result in massive failures undercutting other good technologies.
- Maintenance may be beyond skills and budgets.
- Demonstrate life cycle cost effectiveness
- Demonstrate compliance with existing/anticipated environmental requirements

- Demonstrate “state of the art” building science and S.D.
- Justifying the cost
- Cost and cost-effectiveness (respondent put this for all three answers)
- Cost
- More experimental than proven effective and/or efficient
- Cost (respondent put this for all three answers)
- Cost and risk associated with an unproven technology that could prove out over the building life that it was an imprudent use of taxpayer dollars.

2.5 *Capture and Documentation of Lessons Learned*

How important is it, in your opinion, to capture and document “lessons learned” from the Building 170 renovation? Please rate on the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	1	2	6 <i>*but not as a report---rather a living demo</i>

Please rate the relative importance of the following kinds of lessons:

	Not Important	Somewhat Important	Extremely Important
Project Barriers/Challenges	0	2	8
Methods for Overcoming Barriers	0	2	9
Project Successes	0	1	10
Other: <i>Cost effectiveness</i>	0	0	1

Note: One respondent noted “What procedure/policy changes had to change to allow the recommendations to be implemented? (e.g. budgeting) What paradigms (for people) have to be/had to be changed?”

2.6 *Traffic Congestion*

How important is it, in your opinion, to minimize traffic congestion with respect to Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	2	2	6	2

To what extent do you believe that undesirable increases in traffic congestion are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase		Some Increase	Significant Increase	Substantial Increase
1	5	1	3	1	0

Note: Respondent added extra column

Please list any specific measures that, in your opinion, should be used to manage or mitigate the traffic impacts of this project:

- Ensure easily accessible bus connection to MARTA rail system is available
- Easy access o MARTA
- Provide incentives for MARTA; provide showers and bike racks
- Bike racks, MARTA shuttle service; fed mass transit subsidy program (government purchase MARTA passes)
- Plant trees all the way to MARTA
- Implement DOD policy on free transit vouchers
- Encourage telecommuting
- Promote a shuttle service from MARTA throughout the MacPherson office complexes to encourage public transit. Vouchers for public transit. Encourage flexible telecommuting options, especially during Ozone warning days in summer months.
- Better placement of construction equipment and prior warning before beginning construction

2.7 Air Quality

How important is it, in your opinion, to minimize the contribution of Building 170 to poor air quality? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	1 <i>*Outside</i>	3	4	5 <i>*Indoor</i>

One respondent asked “Interior or exterior, or both?”

To what extent do you believe that negative impacts to air quality are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase		Little Increase	Some Increase	Significant Increase	Substantial Increase
1	1	5	3	1	0

Note: This respondent circled both “No Perceived Increase” and “Little Increase”

Note: One respondent noted “Don’t know – just want to ensure none emerge, especially with indoor air quality.”

Please list any specific measures that, in your opinion, should be used to manage or mitigate the air quality impacts of this project:

- **Careful selection of materials, coatings and furnishings. Also ventilation.**
- Ex***** landscape improvements; fuel cell technology
- Monitoring, P2 tech
- Mostly from commuting
- Interior considerations: use carpeting, adhesives and paints with low or no VOCs

2.8 Water Quality and Supply

How important is it, in your opinion, to maximize the contribution of Building 170 to good water quality and to ensuring that sufficient quantities are available, to the greatest extent possible? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	1	1	4	6

To what extent do you believe that undesirable effects on water quality and/or supply are likely to occur due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase		Little Increase	Some Increase	Significant Increase	Substantial Increase
3	1	5	1	1	1

Note: This respondent circled both “No Perceived Increase” and “Little Increase”

Please list any specific measures that, in your opinion, should be used to manage or mitigate the water quality and supply impacts of this project:

- Selection of water efficient technologies, toilets, faucets, etc.
- Rainwater capture; drip irrigation; waterless urinals; flow sensors on fixtures
- Grey water processing system
- Site designs for runoff
- Cisterns?
- Low flow shower heads and faucets. Trickle irrigations for landscape material, use of low water consuming landscape material.

2.9 Urban Sprawl

How important is it, in your opinion, for Fort McPherson to address urban sprawl efforts in the metro Atlanta area through its efforts with Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important	<i>Not Applicable</i>
1	3	2	3	2	1

Note: This respondent added *Not Applicable* column

To what extent do you believe that urban sprawl is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
8	4	0	0	0

Please list any specific measures that, in your opinion, should be used to manage or mitigate the urban sprawl impacts of this project:

- Green designs for landscape, roofing, parking areas
- Out of scale to be meaningful within the 13 county Metro area

2.10 *Economic Development*

How important is it, in your opinion, for Building 170 to contribute to economic development in the East Point and metro Atlanta areas? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
4	2	3	2	1

To what extent do you believe that economic development is likely to increase due to the renovation and use of Building 170? Please rate using the following scale (*circle your response*).

No Perceived Increase	Little Increase	Some Increase	Significant Increase	Substantial Increase
6	5 <i>*short term</i>	1	0	0

Please list any specific measures that, in your opinion, should be used to increase the positive economic development impacts of this project:

- Use of local suppliers and contractors when feasible

2.11 Control of Project First Cost

How important is it, in your opinion, to minimize the initial project cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
1	1	5	2	3

Please list the top 3 aspects of the project that are most likely to affect the initial cost of the project, in your opinion:

- Roof
- Heating/cooling system – design, selected method, and installation
- Outcomes of: arguments between the short-view value engineers and long-term institution builders.
- Degree to which flexibility to modify technologies is forestalled by doing it cheap the first time
- Wastewater treatment/recycling
- Rainwater capture for reuse on-site
- HVAC/fresh air ventilation in corr**** with envelope improvements (e.g. windows and insulation)
- Environmental controls (i.e. HVAC), lighting
- Any changes (significant) to water/plumbing
- Landscaping
- Roof

- Solar
- Maintaining historical integrity of building 170
- Implementing an environmentally friendly place to work and balance cost
- Replacing or renovating infrastructure, impact of surrounding buildings or environment
- Renovation
- Cutting edge technologies often have higher up front cost, and may not be approved by building code enforcers
- Over head cost from Fort Mac's admin support? Corps of Engineers construction overheads??

2.12 Control of Life Cycle Costs

How important is it, in your opinion, to optimize the life cycle cost of Building 170? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	0	3	8

Please list the top 3 aspects of the project that are worth additional initial investment to control life cycle costs, in your opinion:

- Heating/cooling system
- Roof
- Energy – heat/air, as well as commuting – not contributing to metro air quality costs.
- Quality of materials
- Quality of workpersonship
- Flexible, modifiable systems
- Monitoring and diagnostics for energy and IAQ
- Energy-related investments: lighting, HVAC, fuel cells, renewable
- Water/wastewater utilization
- Building envelope
- HVAC system

- Utilities (plug demand, water use, etc.)
- Insulation
- HVAC/geothermal
- HVAC
- Energy
- Water quality and quantity
- Air quality and environmental noise (as opposed to OSHA occupational noise)

2.13 *Historical Preservation*

How important is it, in your opinion, to restore Building 170 (a historic structure) according to Federal and State historic preservation guidelines? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	0	9	3

Please list the top 3 features of the building that are most important to preserve, in your opinion:

- Exterior
- Some stair ways
- Some floors
- External – structure
- Landscape
- General architectural aspect. This isn't an Edison historic lab, for instance, where the dimness and guts portrey an historic ambiance.
- Architectural integrity with respect to “design” elements – high performance reproductions, as appropriate
- Original fascade and internal design characteristics to maintain historic “character”
- Exterior/aesthetics
- Interior features that are historical
- Story of historical uses
- Interior wood doors and surfaces

- High ceilings
- Floor surface
- Historical significance or values to the military base
- Building integrity and safety
- Exterior
- Roof
- Brick exterior
- Windows, the look of the original but not the low quality function; sound attenuation and energy conservation should override restoration to original standards.
- The structure of the building
- The landscape

2.14 *High Quality, Productive Workplace*

How important is it, in your opinion, to renovate Building 170 into a high quality and productive work environment? Please rate using the following scale (*circle your response*).

Not Important	Of Little Importance	Somewhat Important	Important	Extremely Important
0	0	1	4	7

Please list the top 3 features of the project that are most important for a high quality and productive workplace, in your opinion:

- Good lighting
- Aesthetically pleasing – including furnishings
- Air temperature/humidity comfort
- Opportunity for quiet work space, where phone calls don't interfere with someone else's think/work space
- Natural light
- Section 1 #1 (preservation of natural ecosystems)
- Section 1 #2 (resource efficiency/waste elimination)
- Section 1 #3 (preservation of biodiversity)
- Private offices

- Indoor environmental quality
- Inter***/communication technologies
- Lighting
- Thermal comfort
- Noise
- Privacy
- Light
- Temp
- Pleasant working area environment, low outside noise interference
- Parking accessibility and safety
- Work areas designed to flow with common areas, entrances and exits
- Quiet private workspace with the ability to have expanded space for meeting and collaboration with others.
- Information Resource Management Support, optimal mix of LAN, Internet and library resources

Section 3: Background Information

3.1 Project Involvement

What roles do/will you play in the Building 170 project? Please describe how you are presently involved with Building 170, or how you will be involved in the future:

- I would be happy to provide input and review in the process and progress of design and construction.
- N/A
- None
- ?
- Now: none; Future: tenant
- AEPI project manager
- Design input; use input
- Not sure, would like to remain involved

- Occupant
- Little involvement. Unknown as to future involvement. Will I remain on the Tech campus as the sole AEPI on campus POC, unknown.
- Not sure

3.2 *Organizational Affiliation*

With which company, organization, or division are you affiliated?

- AEPI
- AWC – Fellow
- AWC fellow
- AEPI
- ?
- AEPI
- AEPI + GT
- AEPI project leader on loan from Corps of Engineers, 4 year detail max – 1-2 years to go
- AEPI
- SREO
- Army Environmental Policy Institute
- AEPI, Federal permanent, professional staff
- SREO

3.3 *Other Comments*

Is there anything else you would like to say about the Building 170 project, site, or context that we have not addressed in this survey?

- Great concept – building is the briefing
- Tune/commission the building. Design the renovation to provide for tuning and re-tuning: i.e. install dampers in HVAC, access parts, ease of window replacement, any other features that allow responding to technology evolution.
- One wild card consideration: How might the fifth runway at Hartsfield affect Fort Ma/Building 170? Have any noise contours been projected? Is so, what effects upon Fort Mac? This could detract from a quality office environment. Construction of the runway and the additional offsite borrow of fill material required may have deleterious short term effects upon local transportation patterns.

Fort McPherson Building 170
Stakeholder Group Interview Guide
AEPI Personnel

Note: This guide serves as an agenda and checklist for facilitation of a two-hour group interview session. Approximate times are provided as an aid to organization of the session.

Agenda

- 10:00 AM – 10:15 AM Part A: Welcome and Introductions
- 10:15 AM – 10:45 AM Part B: Office Functional Requirements
- 10:45 AM – 11:00 AM Part C: Vendor Selection
- 11:00 AM – 11:30 AM Part D: Project Objectives
- 11:30 AM – 12:00 PM Part E: Future Plans for Facility Sustainability

Part A: Welcome and Introductions (10:00 PM – 10:15 AM)

Thank you for taking time from your busy schedule to participate in this meeting!

Introduction of **Georgia Tech Project Team**:

- Annie Pearce – Facilitator
- Corey Fischer – Rapporteur (will be taking notes as we go)
- Sheila Bosch – Timekeeper and Flip Chart Master (will keep us on track and document on flip charts what we discuss)

Session documentation will be conducted in three ways:

- Via transcript (Corey will be transcribing as we go)
- Via video (Annie will create a video of the session for later review to double-check the transcript)

- Via flip charts (Sheila will summarize what we discuss on flip charts so you can double-check what we talk about as we go along)

Does anyone have a problem with being videotaped as part of this session? (Hopefully not – reassure them that the reason for video is as a backup to validate the transcript. We should also try to find out if they have any problems with being personally identified, since we can keep the transcripts anonymous if necessary).

Background to the project/Reason for this meeting:

As you all are aware, Building 170 is rapidly becoming the most researched building in all of the Army's inventory ;-). Some of you participated in the Sustainable Design Workshop this summer to generate ideas for the building's renovation, and there were a lot of good ideas that came out of that meeting.

Since then, Georgia Tech has been asked by the Army Environmental Policy Institute to take another look at the design ideas that resulted from that meeting, and to see if any improvements could be made to further increase the sustainability of the project. One of our tasks is to talk with different stakeholders for the project and document their objectives and constraints related to the project. That's why we're having this meeting today. You are one of five groups of people we'll be talking to, and we hope to get some ideas from you about who needs to be included in the other groups as well.

Given the role of AEPI in this project, we're particularly interested in understanding **what you expect from your new office space.**

Here's how the session is going to work. Please have a look at the agenda for the meeting today (refer to flip chart). We're going to start by talking about your roles and responsibilities in the project, followed by a discussion of your requirements for the office space (based partly on some of the responses to the Office Environment Survey you all received last week). I hope you all brought your questionnaires with you. If not, we'll collect them from you after the session today.

After we talk about your requirements for the new office, we'll talk briefly (15 minutes) about how you plan to put the results of this project and Southface's into the design. Then we will discuss some core values for the project (based partly on the second questionnaire you received). If we are lucky and have time we will conclude with a discussion of other buildings you'd like to be able to analyze in the future for sustainability improvement opportunities. Afterwards, we'll collect your questionnaires and any other information you recommend to us.

Any questions?

Before we get started, there are a few **rules for today's session**:

- Only one person should talk at a time
- Please make an effort to speak loud enough so that everyone can hear you
- Feel free to ask questions or bring up anything that comes to mind as we go along

OK, now let's find out **who you are**. We're going to go around the room and have you introduce yourselves, telling us what you do and what your specific roles are with respect to the Building 170 project. Please tell us:

- Your name
- Your job responsibilities
- Your role in the Building 170 project

<Round robin on roles and responsibilities – be sure to thank each person>

Part B: Office Functional Requirements (10:15 AM – 10:45 AM)

Now we are going to gather more specific information about your facility requirements. First, we'll take a look at the requirements listed in the Southface (SF) report, and then we'll be asking additional questions to identify your needs.

Review of Requirements Listed in the SF Report

Here is listing of the requirements included in the SF report (hand out photocopies of the two pages). This information was gathered in a meeting between SF and a few representatives from AEPI prior to the charrette. Who here was in that meeting?

First, take a look at the first bulleted list.

1. Are there any items that should be modified? I understand that the requirement for living area suites is no longer a requirement, is that correct?
2. Are there any items that appear to be missing that should be added?

Now, look at the “additional considerations” bulleted list.

1. Are there any items that should be modified?
2. Are there any items that appear to be missing that should be added?

Facility for Support for Office Work

1. Copiers: How many copiers are needed, based on what you currently have? In what locations?
2. Training Rooms: Describe the requirements for your training room? All of these listed may not be requirements.
 - a. Computer
 - b. Projection equipment (e.g., screen, overhead projector, computer projector)
 - c. Lighting controls
 - d. Acoustics
 - e. Smaller rooms nearby for break-out sessions
 - f. Location (easy to find, near restrooms, food, etc.)
 - g. Size (approximate dimensions)
 - h. Maximum capacity
 - i. Special environmental conditions? (humidity range, temperature, ventilation)
3. Are “interview rooms” required?
 - a. Number
 - b. Size
4. Storage Space:
 - a. How much storage space will be needed?
 - b. How many rooms and what sizes?

- c. Will special equipment, such as a forklift or hand truck, be necessary for taking materials to and from storage?
- d. Will loading areas be necessary? E.g., loading dock, wide doors
- e. Will parking space for couriers be required near loading areas, if required?
- f. Where should the storage area be located? E.g., on office floor, in basement, near an exterior door, convenient to a maximum number of employees?
- g. Are there any special environmental conditions that must be met in the storage area? E.g. humidity range, temperature, ventilation, etc.

Office Facility for Meetings and Group Effectiveness

1. Meeting Rooms: Please describe your requirements for meeting and conference rooms.
 - a. Number of rooms
 - b. Maximum capacity
 - c. Approximate dimensions
 - d. Computer
 - e. Projection equipment
 - f. Lighting controls
 - g. Acoustics
 - h. Location (easy to find, near restrooms, food, etc.)
 - i. Special environmental conditions? (humidity range, temperature, ventilation)
2. Work Groups: Are work groups a major component of AEPI's mission? If yes:
 - a. How many people typically make up a work group?
 - b. How many different work groups may be on-going simultaneously?
 - c. Do the workspaces of individual workgroup members need to be in a single cluster?
 - d. Does the area where the group works together need to be separated from other areas? If yes, are full-height walls necessary to designate the work group area? Are other types of separation (e.g., plants, partial-height dividers) necessary?

Sound and Visual Environment

Please respond to the following. You will each choose one of the options for each category.

1. Privacy and speech intelligibility

- ☐ Excellent speech privacy is required to keep discussion confidential, even with raised voices. Workstations must also be able to easily understand quiet speech.
- ☐ Good speech privacy is required to keep discussion confidential with slightly raised voices. Need to understand normal speech within each workstation.
- ☐ Speech privacy is required for normal voice levels. In open plan areas, staff are prepared to lower voice to get speech privacy. Need to understand normal speech without strain.
- ☐ Speech privacy is not often required. Staff are prepared to close the office door and lower voices. No need for speech privacy in open plan areas. Speech intelligibility is not critical.

2. Distraction and disturbance:

- ☐ Individuals, even in open plan areas, must be able to easily concentrate on their work at all times, free from distraction.
- ☐ Individuals can concentrate on their work at all but a few times a week, or in all but a few localized parts of the office. Must be free from all but the occasional distraction.
- ☐ Operations do not require special levels of concentration by individuals in open plan areas.

3. Lighting adjustments:

- ☐ Illumination levels must be readily adjusted on short notice to provide for very different types of work. Task lighting is required for all or most occupants.
- ☐ General illumination levels can be readily adjusted by occupants. Task lighting for many or most occupants.

- ☐ Require on/off control of general lighting. Few tasks require different qualities and amounts of general illumination. Task lighting for some.

4. Distant and outside views:

- ☐ Require all staff to see the outside from their workplaces, almost all while seated.
- ☐ Require most staff to see the outside or to an atrium while seated.
- ☐ Require the majority (2/3) of staff to see the outside or to an atrium.
- ☐ Require the minority (1/3) of staff to see the outside or to an atrium.
- ☐ No requirement.

Image to Public and Occupants

Please respond to the following. You will have 3 options to choose from, and we will take one vote from each person.

1. The building should be:

- ☐ A prestigious building, highly regarded by most people, spotlessly clean, and very welcoming to visitors and staff
- ☐ An above average building regarded as attractive, clean, and welcoming to visitors and staff
- ☐ A building with average appearance, basically clean, with approaches and entrance that project a “standard image”

3. The public lobby should be:

- ☐ Prestigious, with top materials and condition, spacious, and very attractive. Interior signage must be of the highest and best standard. Requires a staffed information desk to welcome and guide visitors at all times.
- ☐ Above average in quality, size and professional image. Interior signage must be of a high standard. Require a staffed information disk in active hours.

- ☐ Average quality, size and professional image. Interior signage must be adequate.

4. Public spaces must be:

- ☐ Of highest quality. Many important visitors need access to many parts of the organization. Washrooms must be readily accessible of high quality
- ☐ Of above average quality. The general public visits many parts of the organization. Washrooms must be readily accessible and of good quality.
- ☐ Of average quality. Need to project image of service combined with thrift. Washrooms need only be provided to a basic standard.

5. Office spaces should be:

- ☐ High quality image, including distinctive character, excellent appearance, and a well-coordinated interior. The spaces must appear generously sized throughout.
- ☐ Higher than normal image, including some distinctive features, good overall appearance, and consistent interior. Spaces must appear moderately sized throughout.
- ☐ Average appearance. The office spaces must appear adequately sized throughout.

6. Finishes and Materials

- ☐ Project the highest quality image to staff and visitors throughout office areas
- ☐ Project an image that is clearly of above average quality
- ☐ Be comparable to facilities of other organizations with similar function or business in the locality.

7. Identity Outside Building:

- ☐ Require maximum exposure to the public. The building and signage must be very easy for pedestrians or motorists to find and recognize, even for those unfamiliar with the locality.
- ☐ Require above average exposure to the public. The building and signage must be easy to find and recognize, even for those unfamiliar with the locality.

- ☐ Require average exposure to the public. The building and signage must be easy to find and recognize, for those familiar with the locality.

Part C: Vendor Selection (10:45 AM – 11:00 AM)

This section is going to be structured mostly as open discussion. We've got questions for you regarding the implementation of recommendations that will be made as part of the this project or were made in Southface's report. When we say "vendor selection" we are mean the A/E firm who will design the building, the GC who will construct the building, and the garrison personnel who will maintain the building. We will talk about each "vendor" separately.

A/E Firm (Design)

- What influence does AEPI have on A/E selection? Ft. McPherson garrison-level personnel indicated that they have already spoken to an A/E firm about the design of the project and they were apprehensive about the recommendations made in the Southface report.
- What criteria would you impose beyond the USACE requirements?
- How will the results of this project and Southface's previous study be used in the design phase?
- What is the best way for us to present our recommendations such that they are useful and implementable?

General Contractor (Construction)

- What influence does AEPI have on GC selection?
- How will the results of this project and Southface's previous study be used in the construction phase?

Garrison-Level Personnel (O&M)

- As a tenant, what influence does AEPI have on the products and services that will be used in the O&M of building 170?

Part D: Project Objectives (11:00 AM – 11:30 AM)

Note: This section has two options to engage the group depending on the amount of time remaining. The first option asks questions from the Stakeholder Survey (Core Questionnaire) and requires sticker voting; this option will take the **LONGEST** amount of time. The second option asks questions from Section IV of the Office Questions survey and requires a simple hand vote; this option will take the **SHORTEST** amount of time.

Option 1 note: The items in this section correspond to questions from the Core Questionnaire completed by the group prior to the meeting. Questions have been reordered to permit those questions with most discussion potential to be covered first. If time permits, questions marked with an asterisk (*) will be covered. For most questions, a flip chart list will be made of the responses, and participants will be asked to vote for those items they believe are most important. Voting will be done by giving each participant three sticker dots per question, and allowing them to allocate those stickers to questions to reflect their importance.

1) Overall Project Objectives

(corresponds to survey question 1.0)

What did you list as the top 3 objectives for the Building 170 project that must be met in order for the project to be considered a “success”? Are there any other objectives you think should be included in this list?

<List of Overall Project Objectives;

Have them choose top three via votes (sticker dots)>

2) Embodied Environmental Values

(corresponds to survey question 2.1)

One of the objectives identified by AEPI is to have the building reflect the environmental values of the Army. What environmental values do you think the project should exemplify? Are there any other values you think should be included in this list?

<List of Environmental Values;

Have them choose top three via votes (sticker dots)>

3) Demonstration of Cutting Edge Technologies/ Sustainable Construction Practices *(corresponds to survey questions 2.3 and 2.4)*

What did you list as technologies or sustainable construction practices that should be considered in this project? Are there any other technologies or practices you think should be included on this list?

<List of Cutting Edge Technologies/Sustainable Construction Practices;

Have them choose top three via votes (sticker dots)>

4) High Quality, Productive Workplace

(corresponds to survey question 2.14)

What features did you identify as being important for a quality workplace? Are there any other features you think should be included on this list?

**<List of Workplace Attributes;
Have them choose top three via votes (sticker dots)>**

*** Historical Preservation**

(corresponds to survey question 2.13)

What did you identify as being important to preserve from a historical standpoint? Are there any other features you think should be included on this list?

*** Lessons Learned**

(corresponds to survey question 2.5)

Anything about lessons learned that you want to discuss?

Is a system already in place to capture lessons learned? If so, what is it like?

Do you formally use lessons learned from other projects as part of your job?

Option 2 note: The items in this option correspond to Section IV – Building Operations from the Office Environment Questionnaire completed by the group prior to the meeting. Participants will ask themselves *To what extent do you think the building design and operation **SHOULD** show the following characteristics.* For each characteristic each individual must choose Not At All, Somewhat, Moderately, Very Much or Don't Know. After the statement and characteristic is read, each of the five potential "votes" will be announced. Ask participants to raise their hand when the response is read that they agree with. Count a show of hands for all possible response for each characteristic.

SECTION IV BUILDING OPERATIONS

*To what extent do you think the building design and operation **SHOULD** show the following characteristics:*

	Not At <u>All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>	<u>Don't Know</u>
a. Caring for the natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Energy consciousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Opportunities for recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Concern for the surrounding community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Pollution prevention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. To what extent does the building present a positive image?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. To what extent does the building provide contact with the natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. To what extent does the building provide contact with wildlife	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part E: Future Plans for Facility Sustainability (11:30 AM – 12:00 PM)

Note: This section will be conducted as a semi-structured open discussion along the lines of the listed questions.

We're in the home stretch now. We have a few final details to clear up, primarily dealing with how the Army plans to proceed with its sustainability efforts in the future.

One of our goals for our study is to demonstrate a method for identifying ways to improve the sustainability of facility projects. We hope that this method will be useful for future Army projects beyond Building 170.

- What kinds of projects are most likely to be considered for sustainability analysis? Why?
- Who will be involved in trying to implement sustainability for those projects?
- What other efforts are underway now relating to sustainable facilities and installations?
- Where in the project delivery process is sustainability most likely to be considered?
- What would it take to get additional funding allocated for sustainability projects (if necessary)?
- Who would be most likely to conduct sustainability analysis for future projects? Installation personnel? Design/USACE? Contractors?
- What can we provide them in terms of tools and guidance to make their job easier?
- What will have to happen at higher levels of the Army hierarchy to promote implementation of sustainability?

Fort McPherson Building 170 Stakeholder Group Interview

AEPI Personnel

10:30 – 10:40 Part A: Welcome and Introductions

Welcome. Thank you for coming. Does anyone have any problem with videotaping?

How many of you have heard of the Building 170 project? ALL

How many of you have heard of Georgia Tech's involvement in the project? About ½

There are 3 things we want to accomplish in this session today:

1. What are your objectives for this building? What will it take for you to be satisfied with the outcome?
2. What are your constraints? What are the absolute requirements that must be met by this building for you to accept it as a building you will occupy?
3. In the future we hope the project and procedure will be useful in other projects. We hope to get information on the procedure and in hopes that we can make recommendations to improve the procedure in the future.

There are five sections and we are a little off on time. Go over schedule.

Go over rules

Introductions (name, job title, and any responsibilities you have with respect to this project)

Kiara Claire, research associate with AEPI, hope to be an occupant

Linda Sons, Southern Regional Environmental Office, have all kinds of options

George *, chief of Southern Regional Environmental Office, a small office of about 7 people that is tenant with AEPI

John V., part of AEPI staff, hope to be an occupant as well

David Eady, research association with AEPI, lead on the building 170 sustainable design and renovation project

Denota Renfro, possible tenant

Dick Wright, director of Army Environmental Policy Institute

Rick Sinclair, project leader at AEPI and hopeful tenant

Bob Gerrit, project leader at AEPI and expect to be a tenant

Ron Webster, potential occupant, interested in project because does not know a lot about it

John Fitapoldi, like Ron am not sure where I will be sitting but will report where told

Hoge Green, operations officer for AEIP plus project leader, hope to be a occupant/tenant Peter Zustarki, work at AEPI and participating in this

I would like some clarification at this point. Some of you are saying “possible tenant” can anyone explain why you are saying possible? Sure, I’d be glad to (Dick Wright). About 60% of the office are IPA’s (intergovernment personal actions). The law says that you have 4 years from the time of “hire.” I have told staff that this is not a permanent place but rather a transient place to do work. Government employees will go with AEPI. Everyone should count on being an employee of AEPI for only four years. Of course since it will be at least two years before we will occupy this building, most people will be past their four years.

10:40 – 10:45 Part B: Office Functional Requirements

Now we would like to talk about functional requirements. And for those of you who do not know if you will be here to occupy the building, we ask you to consider the requirements you would have if you would be here. We do this because we are under the assumption that the people who will come to fill your shoes will have the same requirements as you. Is this a fair assumption? YES

You may or may not know about some of the studies that have previously been done on this building. It is becoming one of the Army’s most studied buildings. I am passing out a list of three things that came out of previous studies:

1. List of functional space requirements
2. Additional considerations
3. Overall general objectives of the renovations

Did any of you participate in coming up with this list of ideas?

(David Eady) The list came out of a preliminary meeting with Walter and talked with staff that was here. There was some amendments to the preliminary list in a follow-up report such as the two living suites which Marty told us to nicks.

There were at least half dozen, if not 8-12 people there (Rick Sinclair). David, Rick, information technology person was there to include his requirements, project leaders, the administrative person as far as general office requirements and some transient folks as well.

It was the first list generated. We would like you to see if other changes are needed to the list. We will go over 1, 2 and 3 and then overall project objectives later. Have a look and I will go down the list one by one as soon as you have had a chance to look it over.

Let’s start with functional requirements first.

There is a requirement for four executive level offices, do you still need them? Definitely would like to have 4 executive level offices.

What about smaller offices? There is a requirement for 26 of these guys.

Dick Wright: 26 is probably the right number but size (10 X 14 = 140 square feet) exceeds army standards (90 SF) so there is a question about whether the Army will fund it. Current office space is about 140 SF.

David Eady: The way the in which the building is laid out is that there are some floors where they are sliced up into individual rooms for treatment that are about 9-1/2 by 13-1/2. That would probably be as small as we could go in order to maintain as much of the original wall space as possible, which was an objective. These offices would be comparable to what we have now which is about the Army standard but because we are doing adaptive reuse there maybe more room for flexibility.

Dick Wright: In consideration, there may be a requirement for smaller offices or one office with more than one worker (2 or 4). The pentagon is literally being ripped down and there won't be anything but cubicles there soon. To maintain a single office is to go against what the Army is doing for everyone else. This (current offices) is leased space. It will be more difficult to justify this (larger, single offices) in an Army building.

David Eady: There are 26 offices that exist as smaller offices that exist as rooms currently so there will be some room for reconfiguring as Dick has suggested. I think we have about a dozen (give or take) project level people at AEPI.

Dick Wright: I suggest that we come up with the best answer and it may not be 26 individual offices.

In your previous space you had cubicles, correct? It seems that you would like to preserve the current office set-up.

How many occupants would you like to have in an open plan?

Dick Wright: Whatever you come up with. We are looking for this process to come up with the best answer. I don't like cubicles. Reality is that we cannot dismiss cubicles.

Linda Sons: Does the building allow for this?

David Eady: There are some spaces particularly in the north building that was a ward building that has a large open area. In the southern building it is more broken up but there are rooms where you could fit four people in one room. We could look at this as an opportunity to tier the office structure where you have executive level, project management level and research associate I (entry-level). We are targeting the southern building which is the one that does not allow for the open floor plan except in the basement where we could open it up.

I would like to go back to what you said a minute ago, Dick. That you are looking for the best solution, not necessarily what you prefer or what the Army would prefer. What criteria are you looking at when you say best?

Dick Wright: The Army would argue that everyone should go in a cubicle (90 square feet), two larger offices (no greater than 15 by 15), and some common space for fax and copy machines. That may not be the best answer because you have twenty people participating and need to get a conscience. A better ideas of an outsiders view of what you hear are our requirements and what you hear is our work and then you putting that all together to determine what will work best way to make it happen. The key will be that there has to be flexibility because when put up hard wall dictate the office layout and maybe how the office will operate. I don't know what the best answer is. I am looking for this process to come back with what the best answer is.

David Eady: I think that the fact is a historic building and we are trying to preserve not only the exterior but the interior as well, we have to see that we are looking at operating under constraints due to adaptive reuse.

Dick Wright: If we were doing to sit down and ask for the design to be built we would probably do it differently. So there will be some tradeoffs. The space might work if we worked more in subgroups or teams, but we are a relatively flat organization. The space that we are in is not the best space for me. There are realities to how we do work.

John F.: Is there a need for secure room in our growing? Secondly, I see nowhere on here that specifies a preference of access to nature light? Can we ask for optimizing natural light as opposed to being put in a dark room?

There have been times when AEPI has upgraded staff in anticipation of seeing high security documents.

Dick Wright: This office will never be top secret. If we want to review anything we would go to where it is. The most we need is windows that can be closed and you cannot see into and a safe that cannot be moved by 4 humans.

Do we need a space for a vault? No, not a vault just a safe.

David Eady: There are actually 2 vaults, one in each building.

Peter: Why can't we use building 200 because it has all the security and it is right across the street? They have a security manager over there as well. Why don't we use building 200 and just get out of the business of security issues.

Dick Wright: Put down that we don't need a secure room. We will figure out a way and place to review our documents.

David Eady: Many we need access security so that things do not walk away.

Bob Gerrit: Dick brought up the standard that is being applied at the Pentagon and I thought we should bring up some other standards that are being used at other locations. I have not been at these places so it may not be what we desire. The Center for Army Analysis at Fort Boulwire (sp?). They are in the head business that we are. Institute for Board of Resources. The Faculty Facilities at the war college.

David Eady: There have been some studies on workspace that have been conducive to certain type of work. I don't see why we can't ask for new standards based for certain work classifications. That was what General Miller kept bringing up that this was going to be the new standard for doing business at Ft. Mac and across FORSCOM. If we are putting people in too small of a box for certain types of work, maybe that is something that needs to come out of this.

Dick Wright: There are Army standards for space and we need to be sure that if we deviate from them that we will be able to justify it. One of the things is that legal council need private offices regardless of rank. Why? Because they conduct confidential business with their clients. In the Pentagon you have to be a supervisor and senior. We need to be able to justify anything we do outside of that standard. As David said, it is an opportunity to set a new standard for a think tank.

Rick Sinclair: Would be useful for you to see the standard as a point of reference.

I would also like to point out that it is an opportunity for you to set a standard for reuse a historic building.

John V.: It is clear that we are becoming a flatter and flatter organization. Some of that is due to the leadership and some of it is due to the way the organization is going. But part of it is that we are in a building now is more conducive to a flat organization. The space we had over at Georgia Tech suggested more of a two-tiered structure with the outside (windowed) offices and the internal offices. It is possible that decisions we make about building 170 will lead the organization toward one organizational structure or another because of the way it is set-up (even if they are all the same number of square feet).

George: I would like to suggest that you get to the head master planner at Ft. Mac to see what standards the tenants now are using. They have Army and non-Army tenants.

David Eady: For instance, AAA just moved into a building there (barracks).

Bob Gerrit: There are two items on the functional requirements that I would like to bring up, large conference room and training room to support multi-media education and outreach activities. When moved to Atlanta, it was planned that we were going to be place/space for workshops. We subsequently planned space accordingly to be able to accommodate up to 30 people. We were subsequently forced to drop the square footage out of our lease because people in Washington wanted the money to go to other things and we never got into the workshop business. If we are going to be sponsoring a lot of workshops, we should consider whether we are going to have that type of space. It looks like from this list that the two spaces are redundant and the conference room is too small to use for workshops.

David Eady: The conference room space was based upon our current space. The way in which the building is laid out, if you chop off one end of the building it is a pretty good space for a conference room, larger than what we have now. We did look also look at the basement which has more of an open feel as an opportunity for training. It can be a general utility space.

Dick Wright: One of the things we need to look for when you go through this is if we are going to consider training space and if there is space at Ft. McPherson that we may use. It is not like being here or on campus, we will have the other spaces of Ft. Mac to use. We do need to have a conference space available with a bit more capacity than this; this is a little uncomfortable. And then we need to have something where we can have larger groups work, maybe one or two of those. Part of our survey would be should be what other spaces are there that we can use. We are never going to use all the space, it is much too large for us.

Denota: It would be a waste also if training did not become 70% of our mission. It would be a waste for only one or two conference per year.

Dick Wright: The other thing to consider if that if we have a conference space it will be come part of Ft. McPherson. We need to consider the best way to maintain flexibility. In addition, we need to make sure that SREO has office space that is a little larger than what they have now so they have flexibility within their office space.

George: We know right now that there is a good chance we will get another face or two. I mean we are not going to grow large but we will probably be larger than the 6 or 7 we have now.

Dick Wright: And I think the other thing is that George is able to maintain his integrity without being separated. He can have integrity of his space like he has now but that he is not separated.

George: There is quite a bit of space at the commons where the golf club is. We use it all the time. It is underutilized. There is a golf club, pro shop, a restaurant, they have great space with A/V. They can accommodate anywhere from meeting of 30 to groups of 300. It is an ideal set-up. And the rent is reasonable. We use it quite a bit. The space has the “standard” A/V. There is a small charge but it is minimal. If you do it with a lunch there is no charge.

John V: What about the two living area suites? There are gone right? ALL agree to that.

Dave Eady: Apparently that was suggested rather early on.

Denota: It would seem like that one of the things that we should do is to not do things to promote 1-vehicle commuting. Whether it be the size of the parking lot, alternate fuel vehicles with staff pick-up, preferred parking for people that car pool, we need to not promote 1-vehicle commuting. MARTA is about 1-mile from building 170. The idea of shading the walk was presented to make it more comfortable. We need to move into a situation where MARTA will be intolerable. We will build whatever the Army provides. What other kinds of things do we need to think about to commute about public transportation? Golf cart.

For how many will it add to commute? Majority increase (7-8). Free parking will be an incentive.

What about a computer room and IT office?

All the tenants get support from the DOM on post so why do we need to maintain a separate capability. There are people that think we need a separate system for one reason or another. Ft. McPherson will be more than happy to have AEPI pay for something they have to pay for anyway.

Has the issue of wall mounting furniture been resolved?

Finding studs that we can mount modular furniture on it is always an issue. Potential costs need to be included for new furniture. Are we looking at the potential of getting new furnishings?

Natural light needs to be an additional consideration. Human health studies show that people are happier and more productive with natural light. The light is there but how do you harvest it while reducing energy loads, etc. Sometimes we take natural light as a given but it is not a given.

Potable water is not available here. Are you expecting potable water in new building?
YES

Individual occupant controls? Daylight, heat, ventilation. If this something that you would like but do not require?

We do not have it now except some control with lighting via blinds and task lighting. Can we have the ability to trade off overhead lights with task lighting?

Do you need both types of light?

General indirect lighting is best. There is too much candle power in this conference room and coming down on individual desks. Are the standards much greater than needed? Was this issue resolved in the last 10 years? The answer is general lighting with some control plus task lighting.

Are there any other types of mountable furniture that will not damage walls? The plan is to buy new furniture with part of the \$500K for transition costs.

Where do we stand on funding for building rehabilitation?

Ray Clark was talking to appropriate people so that UFR was highest on list. We are still \$2.7 million short.

What does the environment need to have for you to get your work done?

There is either a lot of noise or not enough privacy. Executive-level personnel should have closed office plus the lawyer (soon coming). The conference room or training room need to be designed as "closed." Work is very different (i.e. coordination vs. quiet time). It is not necessary a privacy issue but an annoyance issue. Productivity would be reduced if there is no noise buffer. The majority of people would be happy with office doors that shut. The optimal would be to have closed offices. The building also needs good insulation on overhead ceilings. There is a need for noise to be muffled, not necessary soundproof.

What about visual privacy, is that necessary? Also views, are they necessary? You all need a view and an outside balcony, right? HAH...HAH...

If you have sunlight then you would have a view to the outside. Landscaping views could be enhanced since it will be new landscaping.

Are odors an issue? A fan could be added so that the negative pressure keeps the smells in.

What type of equipment will need to be isolated?

David Eady: Printers, scanner, copies, fax, and shredders. We will have the same level of equipment as here but maybe some additional equipment to increase productivity. We can talk off-line about that.

Since we are going to be on more than one floor, there is a need to consolidate the equipment on each floor in one room to separate the sound and noise.

What about portable workstation where people can plug in to?

Currently there is space but not equipment. Need docking station that is designated for that purpose and has ports for a computer and a phone.

Is that suitable for open architecture? What about guest workstations which is on the list?

Temporary personnel and guests could use a cubicle.

Image that you want the building to convey? Is it permanent home?

General image....2 words come to my mind: Spartan (not a lot of bells and whistles)

Yes, if they move there will they stay.

How much needs to be designed to AEPI's needs and what happens with the next tenant?

If it is something that can be seamless to user than we should put it in but if not then forget it. Should not be thought of as a money pit or Taghmahall. Building 170 should be seamless integrated into Ft. McPherson. It should be only after you enter the building that you know that there are sustainable technologies in it. The post will dictate a lot of what can be used. Is there something that we can do with landscaping?

Balance between transparency and usability of technologies. Conducive to learning and transparent to every day working. The opportunity for demonstrating should be obvious. Instead of using fescue, use durable grass with less water use. There is also a need for signage to show sustainability concepts.

The building will be metered separately.

David Eady: The metering may need to go beyond the standard metering. In addition, more space may be needed for metering in order to make it a demonstration place.

Are you expecting people to come through as a walking tour?

Yes, with a tri-fold brochure telling you where to go and explaining technologies. All staff should be able to do a walk around to show technologies. However, signage is NOT in budget and needs to be added because it is a significant amount.

Do you need fiber optic to every desk?

Basic things like what we get if we do weigh in on this vs. if we don't weight in on this. We need to set our standards NOW.

11:45 – 11:00 Part C: Vendor Selections

Participants would expect that AEPI will be invited to be part of the scoring team to review proposal. In addition, AEPI will also be able to create selection criteria.

What selection criteria would you use?

C&D was already done before we got involved. The installation did not seem to have much control over what happened. IDIQ was already chosen and had the contract language. There was a practical issue of staging. Could not stockpile materials and then leave them until ready to use again. The materials had to be taken off-site because of contracting issues and once it was off-site it was not the contractors issue. There was a number of people under contract (IDIQ) that could have been used. They chose a contractor that could do abatement as well so they were more aware of environmental issues.

Someone that has demonstrated capabilities in sustainable design and specifically in historic reuse. There are people that have done the sustainable design (EPA building in Chapel Hill). We need to get the right people to get sub-tasks. Atlanta Contracting Center will be in charge of contracting. The Garrison likes AEPI's input when it is to their benefit. AEPI needs to find the way that sustainability processes can be used within current army setting. It was initially thought that there was going to be a compressed time

frame and doing a design-build was not an option. How many firms have delivery contract?

There is no requirement for DPW to let AEPI know what is going on. Maybe we need a MOU with DPW to state when AEPI will get involved, etc. It is needed because DPW may not see how a simple decision can affect the sustainability of the project as a whole. DPW is afraid that AEPI will put up roadblocks. We are putting \$2.7 million on the table and there is a lot more we can do. They will work for us but there is no incentive for DPW to work with them. The informal exchanges (like with the roofing contractor) are most valuable. An MOU will only go so far.

11:00 – 11:30 Part D: Project Objective

skipped

11:30 – 12:00 Part E: Future Plans for Facility Sustainability

How will the project be used in the future? How can we make our results and process better so that they will be useful beyond building 170? What type of building do you think sustainability can be used for?

Need to build a new criteria manual so that Army can see what will work and what won't and why for both. We need to record what was done, what wasn't done, and why it did or did not work? Maybe we can get Ft. McPherson to give up the project to the Savannah district because they are going toward sustainability whereas the garrison is reactive. The district can they capture the lessons learned, etc. We need to work the Savannah district through the process with CERL providing expertise that the Corps does not currently have.

AEPI can be a bridge for tenants, garrison and the district to all work together. There is a disconnect between the Corps and the installations; it is systemic.

Let's work through the process to see what the ideal should be.

Corps being contracting office. Design-build will add another year to the project. Need to work with Ft. McPherson (Pat ?) to commit CERL folks and be able to gain commitment.

It is the tip of the iceberg. It will probably be an academic drill mostly because we may not get funding. Getting the funding is not enough, we need to not just provide advice to the DPW but have some kind of check to see what they are doing. We need to make sure that whomever is doing the work KNOWS what they are doing! The DPW will let us play in direct proportion to the amount of the check and the amount of work required above the typical. We need to push that they add a tag onto the contract that can bring and teach sustainability design concepts (mentoring). If Ray Clark and Paul Johnson buy-in and give the money they will. Money will provide influence but not necessarily good sustainable design. Ninety percent of the money will go toward typical equipment and building processes. That means we have only 10% to get sustainable design implemented. We need to educate ourselves (AEPI) so that we can provide a benefit to the Garrison. It is an intensive effort on AEPI's part. We may need to go out and get more funding in order to move the project into the demonstration project. Energy crisis and momentum have put us in a better position to make it a demonstration project. CERL thinks it is better to work with the progressive districts.

We are desk jockeys. Health and wellness is part of the army. Having a PT program and siestas. Gazebo's outdoors in order to work and eat. More encouragement of PT. There was talk of having a workout room in the basement in order to encourage PT.

AEPI Meeting 2/5/01

Combined SFI Staff Notes

Attendees included:

Kera Clair, Linda Sounds, George Koralis, John Wichet, David Eady, Donata Renfroe, Dick Wright, Rick Sinclair, Bob Jarrett, Ron Webster, John Fittipaldi, Hoagie Green, Peter R.

When introducing themselves and their role with the building 170 project, several said they hoped to be tenants. When asked to clarify, DW explained that about 60% of the staff are on IPAs which can only be for 4 years maximum.

Discussion of Requirements

The meeting was opened with a statement of purpose. There are three kinds of information we're trying to gather in this meeting:

1. What are the objectives the facility has to meet in order to satisfy you, the tenants? In other words, what are your objectives for this facility?
2. What are the constraints in terms of how the building MUST function that might rule out possible solutions? In other words, what are your absolute requirements and feasibility constraints for the building?
3. How will our results need to be presented in order to be useful BEYOND Building 170? In other words, what's the best way to try to capture this information, given how the Army functions?

The group was asked who had been present at the meeting with Walter Brown from Southface to develop the list of functional and other requirements. Linda, David, and Rick were present. Overall objectives for the building include:

- Transparency – demonstrate that green doesn't have to be uncomfortable
- Benefits – demonstrate the benefits of green technology
- Subtle – show that green technologies don't have to be outrageous but can fit within the normal office environment.

The list of requirements was read silently by the group and the following items were discussed:

- Executive suites: four total offices still required
- Smaller offices: 26 smaller offices is about right, but private offices may not be the best solution. Also, the size is beyond Army regs that require 90sf. DE stated that Building 170 has several rooms (former exam rooms) divided up into about 13.5 X 9.5 ft. Because it is historic, preservation of much of the interior may be desired. There are approximately 12 officer-level employees that may not need private offices. DW stated that the Army may require cubicles of 90sf, as in the Pentagon model. Others suggested looking at the Center for Army Analysis space. If AEPI is going to deviate from Army requirements, must justify why. Perhaps AEPI can help create a new standard for a “think tank” organization.
- Space allocation: AEPI is targeting the use of the south building.
- Secure Areas: A secure room was discussed – not a requirement. It was decided that building 200 across the street should be used for those purposes.
- Organizational Structure: The current building is conducive for a more flat organization. The decision made on Building 170 could influence the structure of the organization.
- Training room: may not be needed. Originally, AEPI was going to be a site for training, but had to drop their space needs and as a result the AEPI is not really a workshop provider. It was suggested that a training room be combined with the conference room. However, Ft. MacPherson already has space that can be used for training and workshops at a very low rate. Rooms will accommodate approximately 30-200 people.
- Work group areas: needed. These should be larger than the standard office where work groups can meet and work together.
- Conference room: larger than present one needed. Should possibly include Digital Satellite Service (DSS) or cable service to the conference area.
- Southern Regional Environmental Office: needs a space that is larger than current space. It should be independent enough, but still connected to the larger group. Contiguous space that can accommodate an additional one to two people is desired.
- Parking: Don’t promote more 1 person per car travel to work. It’s not an easy walk from the MARTA station. The move will increase the commute of the majority of employees in the meeting, but decrease it for 2. It will be desirable to consider an alternative fueling station for existing vehicles or future vehicles to shuttle people to/from the MARTA station. Don’t build more parking. Include preferred parking for carpools and AFVs. Consider shading the walkway to the MARTA station.

- Computer room: maybe not a requirement. At Ft. Mac, the DOIM provides computer support to all tenants. Is it adequate? The regs specify the role of the DOIM and what it should provide.
- Furniture: No resolution on the wall-mounted furniture. If \$\$ becomes available, new furniture will be purchased. A UFER has been submitted for \$500 K for the transition to the new building and that includes furniture.
- Potable water: is an expectation in Building 170; not a “given” in current building.
- Lighting: Daylighting is desired. Not likely to be a problem with the narrow building design. Individual control is desired (required?). Many have task lighting now. General indirect lighting was suggested combined with individual task lighting.
- Funding: Ray Clark will talk with the ACSIM and others to make sure that the project is a high priority UFER. \$2.7 M is still needed for the building plus the \$500 K for the transition costs.
- Privacy: Executive level offices need it and lawyers (required by regs). There is one lawyer at AEPI. Otherwise, there is not so much a need for privacy as there is to prevent distractions and annoyances. Project management level people are going to want a space where they can close a door. The ideal is discreet offices for as many as possible. Need for good insulation in the ceilings, but don’t need complete sound insulation.
- Visual privacy: No real response to the question of whether this is a requirement. Views to the outside are preferable and can perhaps be enhanced by the landscaping.
- Odors: Can be a problem, particularly for those near the kitchen area.
- Equipment: Have printers, copiers, scanners, fax machines, shredders, etc. at a centralized location on each floor. May need a dedicated room for this purpose.
- Hoteling stations: Desired (required?). Currently have space, but not the equipment necessary to make it work now. Ideally, it was suggested that everyone have laptops and plug in anywhere for seamless work regardless of location. There seems to be a bit of “history” with this issue, as one employee said he was tired of dealing with it.
- Phone service: direct phone lines to the offices have been previously discussed and are an aspiration for the new building.
- IAQ: Active measures to ensure good IAQ were suggested. Commissioning is also important.
- Flexibility: flexibility of the space is a key consideration. AEPI does not want the nature or configuration of the space to dictate organizational structure.

- Contextual integration: Seamless integration with the Fort McPherson “campus” is a goal for the facility. It will function as a typical “white paper office environment”.

GTRI needs to get the Building Criteria Standard for the Army.

Discussion of the Image

What does the building need to do to project AEPI’s mission?

- AEPI plans to make Building 170 their “permanent” home, but much effort should be put into making it flexible for possible future tenants.
- Building 170 should NOT be thought of as a money pit or Taj Mahal. The building should seamlessly blend into the fabric of the surrounding buildings. Once inside, some of the “green” features will be noticeable as educational displays, but otherwise unnoticeable. Maybe the appearance should be “Spartan”. The core should be exemplary, but without “frills” (this term was not used in the meeting). The green features should be subtle to give people a feeling that they too could “do this”.
- Shade trees and ground covers should require little water and signs could designate why those species were chosen.
- Comparison of energy use to other similar buildings would be useful. Some real-time monitoring has previously been suggested. Perhaps the utility area needs to be larger than usual to accommodate this.
- Would like a “walking tour” (self-guided) of some kind. Signage is very important, but doesn’t appear to show up on budget. The next budget should include a signage component.

AEPI Involvement With Ft. MacPherson

How much involvement will AEPI have in vendor selection, designer selection, etc.?

- AEPI will probably evaluate criteria. Ft. Mac will do most of it. May have 1-2 AEPI folks on review committee.
- Frustration regarding the demo work already conducted was expressed. Even Ft. Mac had their hands tied due to IDIQ (indefinite deliverable, indefinite quantity) contract requirements. Slate was thrown into the dumpster, most likely. Contract

requires the contractor take all material off site. The fear is that AEPI's role will be too passive. It was recognized that AEPI will have a lot of work ahead of them if they really want to be involved and helpful.

- It was suggested that contractors with prior experience in sustainable design and construction and adaptive reuse be used only. The EPA Research Triangle Park is a case study where even subcontractors were required to watch a training video and were provided with additional information.
- It was also suggested that the Savannah District Corp become involved since the Corp is trying to become more "green". Personality conflicts exist between the Savannah District and Ft. Mac.
- There is no requirement for AEPI to review activities, etc. and perhaps a formal MOU between AEPI and the DPW (DIS) at Ft. Mac is needed. Perhaps it would be a good idea to get Pat Rivers involved and other more "progressive" Corp folks.
- Changing at the USACE level will be easier than changing at the Garrison level.
- The idea of mentoring for A/E/C firms via the use of third party partners and sustainability experts was brought up.
- AEPI will have the opportunity to influence the project, but not to guarantee anything.
- May want to seek funding from other agencies for some demonstrations, like renewable energy sources. Money for R&D may be available according to CERL.
- Work-out room in basement: Not really necessary, as the installation has a facility, however, it had been suggested by the previous commander and would be desirable.
- AEPI should set high standards and adjust to what they can really get.

Office Environment Survey

SECTION I. YOUR WORKPLACE

1. *Type of workspace you occupy most of the time:*

- ☐ Private enclosed office
- ☐ Private cubicle
- ☐ Open work area
- ☐ Shared enclosed office
- ☐ Shared cubicle
- ☐ Reception area
- ☐ Free address – no regular workplace
- ☐ Other (please describe: _____)

2. *How frequently do you work in a place other than your normally assigned work space (e.g., in other buildings, at home, etc.)*

- ☐ Never or rarely
- ☐ One day per week on average
- ☐ Occasionally, but not regular
- ☐ More than one day per week on average

3. *Please check any of the following ways you have made changes to your private workplace:*

- ☐ Added plants
- ☐ Added posters or other wall décor
- ☐ Added a space heater
- ☐ Added a fan
- ☐ Added personal mementos (family photos, artifacts, etc.)

- ☐ Added own furnishings
- ☐ Rearranged furniture
- ☐ Added a lamp or changed the lighting
- ☐ Other: _____

4. *Here are some characteristics of work environments. For each of the following, please rate the characteristic for you primary workstation (e.g., where you do most of your work):*

	<u>Very Poor</u>	<u>Poor</u>	<u>Fair</u>	<u>Good</u>	<u>Very Good</u>	<u>Not Applic</u>
a. Amount of work space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Amount of storage for work materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Amount of storage for personal belongings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Security of storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Wall area for hanging things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Security from outside intruders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Access to restrooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Access to resources (supplies, copying, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Access to managerial staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

j. Access to meeting rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Ease of finding fire exits in darkness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Desirability of your workspace compared to others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Comfort of your chairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Access to places where you can relax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Convenience of building entrance/exit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Orientation

	Not At <u>All</u>	To Some <u>Extent</u>	To a Great <u>Extent</u>
a. Do visitors have difficulty finding your workspace?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>If there are difficulties, to what extent are they due to:</i>			
b. Lack of appropriate signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Confusing layout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. You work in many different places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. *Here are some aspects of the environment that may sometimes be distracting for work. For each of these, rate how much of a problem it presents for you.*

	<u>How Much of a Problem?</u>			
	<u>Not At All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>
a. Coworkers' conversations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. People walking by	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Phones ringing elsewhere in the office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Noise from the air handling system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Noise from the office equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Outdoor traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Coworkers' music systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Too little sound (e.g. office is too quiet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Too little air movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Uncomfortable drafts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Too hot or too cold in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

workspace

l. Dry air in winter

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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m. Humid air in summer

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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n. Temperatures keep
changing

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

o. Unpleasant odors

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

p. Dust or particulate matter
in the air

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

q. Glare or too much light
from electric light

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

r. Glare or too much light
from daylight

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

s. Too little light for the work
you do

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

t. Lack of daylight

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

u. Lack of view to the
outdoors

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

v. Other: _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7. *People often adjust their environment or engage in behaviors to improve their working conditions. For each of the items below, please rate how frequently you do each activity. If it is not relevant (e.g., you don't have a door), check "Not applicable."*

	<u>Rarely or Never</u>	<u>Sometimes</u>	<u>Often</u>	<u>Very Often</u>	<u>Not Applic</u>
a. Move to a more comfortable location when the environment is uncomfortable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Adjust window blinds to control light or privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Take a quiet break by yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Adjust electric lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Open/close a window or door to control air movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Close door for privacy or for concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Adjust clothing when too warm/cold	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Use space heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Use a fan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Regulate the thermostat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Rearrange furniture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. How satisfied are you with the level of control you have over your workspace?

<u>Very Dissatisfied</u>	<u>Somewhat Dissatisfied</u>	<u>Neither Satisfied Nor Dissatisfied</u>	<u>Somewhat Satisfied</u>	<u>Very Satisfied</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION II. PRIVACY AND SOCIAL RELATIONSHIPS

9. To what extent are you able to:

	<u>Not At All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>
a. Hold a private conversation in your workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Concentrate on your work without distractions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Regulate other people's access to you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. How important is it to you to be able to have a private conversation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. How important is it to you to be able to work without distractions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For this section, we would like you to identify places in the building that you go to for different kinds of activities. In the space provided, you can either note a particular room or a general location.

10. Where in the building do you go most frequently when you want to:

a. Take a quiet break by yourself? _____

b. Have coffee or lunch with a friend? _____

c. Have a private conversation? _____

d. Work in a small group? _____

11. How frequently in the past week have you:

Number of Times

a. Eaten lunch in the building
lunchroom ☐ 0 ☐ 1 - 2 ☐ More than 2

b. Taken a coffee break with a
colleague ☐ 0 ☐ 1 - 2 ☐ More than 2

c. Eaten lunch alone in your
office ☐ 0 ☐ 1 - 2 ☐ More than 2

d. Left the building site at lunch
time ☐ 0 ☐ 1 - 2 ☐ More than 2

e. Run into someone by chance
you have been waiting to see ☐ 0 ☐ 1 - 2 ☐ More than 2

12. *To what extent do you feel that the building and its grounds provide good opportunities for:*

	<u>Not At All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>
a. Informal social contact (e.g., coffee breaks)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Company-wide events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Small group meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Rest and relaxation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Physical exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Spontaneous meetings and conversation with colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION III.

WORK-RELATED EXPERIENCES

13. *Listed below are several work-related experiences. Please indicate how frequently each experience occurs for you, on the average. Check the space on the following five-point scale that best reflects your feelings:*

	<u>Never</u>	<u>Rarely</u>	<u>Sometimes</u>	<u>Often</u>	<u>Always</u>
a. Feeling excited about your work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Feeling overworked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Being in good spirits at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Difficulties sleeping at	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

night due to worries about work

e. Feeling supported by coworkers

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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f. Experience headaches while at work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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g. Experiencing eyestrain or blurred vision while at work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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h. Experiencing soreness in your lower back while at work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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i. Feeling soreness in your neck or shoulders while at work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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j. Feeling fatigued at the end of the work day

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

k. Feeling fatigued during the day

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

l. Feeling distracted by things going on around you

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

m. Experiencing concern for your safety in the building

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

n. Feeling afraid in the building at night

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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o. Feeling afraid walking to your car alone after work when it is dark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p. Feeling concerned about the quality of the air in the building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q. Looking forward to coming to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r. Looking forward to working in this building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION IV BUILDING OPERATIONS

14. To what extent do you think the building design and operation show the following characteristics:

	Not At <u>All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>	<u>Don't Know</u>
a. Caring for the natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Energy consciousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Opportunities for recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Concern for the surrounding community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Pollution prevention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

f. To what extent does the building present a positive image?

☐ ☐ ☐ ☐ ☐

g. To what extent does the building provide contact with the natural environment

☐ ☐ ☐ ☐ ☐

h. To what extent does the building provide contact with wildlife

☐ ☐ ☐ ☐ ☐

SECTION V. BUILDING LOCATION AND CONVENIENCE

15. Please rate the following aspects of the building site:

	<u>Very Poor</u>	<u>Poor</u>	<u>Fair</u>	<u>Good</u>	<u>Very Good</u>
a. Convenience of parking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Traffic control at rush hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Access to highways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Access to daycare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Access to other services you frequently use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Access to bike or walking trails	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION VI. AESTHETICS AND FAVORITE PLACES

16. In this section, we would like you to tell us about your favorite and least liked places in the building.

a. What building characteristic or space do you think best represents the spirit of your company? _____

b. What is your favorite space in the building? _____

c. What is your favorite space outdoors? _____

d. If you had visitors, what spaces would you want to make sure they saw?

e. What is your least favorite building space? _____

SECTION VII.

ENVIRONMENTAL REPORT CARD

17. In this section, we would like you to provide a report card for your building. For each of the topic areas, please assign a letter grade ranging from A to F. Feel free to use a plus (+) or minus (-) with the letter grade.

A = Excellent

B = Good

C = Average

D = Poor

F = Failure

a. Temperature

☐

b. Air quality

☐

c. Electric lighting

☐

d. Daylighting

☐

e. Noise conditions

☐

- f. Colors and décor ☐
- g. Public spaces ☐
- h. Private work spaces ☐
- i. Ability to control environmental conditions ☐
- j. Access to the natural environment ☐

Office Environment Survey

Please note that answers in italics were added by respondent.

SECTION I. YOUR WORKPLACE

1. *Type of workspace you occupy most of the time:*

Type of Workspace	Count
Private enclosed office	12
Private cubicle	0
Open work area	0
Shared enclosed office	0
Shared cubicle	0
Reception area	0
Free address – no regular workplace	0
Other:	0

2. *How frequently do you work in a place other than your normally assigned work space (e.g., in other buildings, at home, etc.)*

<i>Frequency</i>	<i>Count</i>
<i>Never or rarely</i>	5
One day per week on average	2
Occasionally, but not regular	2
More than one day per week on average	2*
One to two days per month	1

Note:

- * One responded stated they *spend ½ time in their office and ½ time in other offices or conference room*

3. Please check any of the following ways you have made changes to your private workplace:

<i>Changes to Workplace</i>	<i>Count</i>
Added plants	4
Added posters or other wall décor	6
• Will add	1
• Plan to do this	1
Added a space heater	1
• Sometimes I want to	
Added a fan	4
Added personal mementos (family photos, artifacts, etc.)	9
Added own furnishings	0
Rearranged furniture	3
Added a lamp or changed the lighting	6
Other: Added boxes for additional file and document storage (solution need effective document imaging system)	1
Other: Only have been here 1 year so I didn't personalize my office as I have in past	1
Other: Added thermostat	1

4. Here are some characteristics of work environments. For each of the following, please rate the characteristic for you primary workstation (e.g., where you do most of your work):

	<u>VERY POOR</u>	<u>POOR</u>	<u>FAIR</u>	<u>GOOD</u>	<u>VERY GOOD</u>	<u>NOT APPLIC</u>
a. Amount of work space	0	0	2	3	7	0

b. Amount of storage for work materials	0	0	5	2	4	1
c. Amount of storage for personal belongings	1	3	4	0	4	0
d. Security of storage	0	1	3	3	5	0
e. Wall area for hanging things	0	0	5	4	3	0
f. Security from outside intruders	0	0	0	2	9 * too good, too tight	0
g. Access to restrooms	0	0	3	1	8	0
h. Access to resources (supplies, copying, etc.)	0	0	2	3	7	0
i. Access to managerial staff	0	0	1	3	8	0
j. Access to meeting rooms	0	0	1	4	7	0
k. Ease of finding fire exits in darkness <i>One responded answered ?</i>	0	0	1	4	5	0
l. Desirability of your workspace compared to others	0	0	3	2	6	0
m. Comfort of your chairs	0	0	3	3	6	0

n. Access to places where you can relax	0	3	3	1	3	1
o. Convenience of building entrance/exit	0	0	2	5	5	0

5. Orientation

	Not At <u>All</u>	To Some <u>Extent</u>	To a Great <u>Extent</u>
a. Do visitors have difficulty finding your workspace?	7	2	1

One respondent did not check a box but added “easy to find with map, but needs some direction”

If there are difficulties, to what extent are they due to:

b. Lack of appropriate signs	2	2	1
c. Confusing layout	3	0	0
d. You work in many different places	1	2	0
e. Other: _____			

6. Here are some aspects of the environment that may sometimes be distracting for work. For each of these, rate how much of a problem it presents for you.

	<u>How Much of a Problem?</u>				
	<u>Not At All</u>		<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>
a. Coworkers' conversations	4	1	3	4	0
b. People walking by	9	0	1	2	0
c. Phones ringing elsewhere in the office	9	1	2	0	0
d. Noise from the air handling system	7	1	2	1	1
e. Noise from the office equipment	7	0	5	0	0
f. Outdoor traffic	8	0	3	1	0
g. Coworkers' music systems	10	0	2	0	0
h. Too little sound (e.g. office is too quiet)	9	0	2	1	0

i. Too little air movement	8	0	3	0	1 <i>*too much</i>
j. Uncomfortable drafts	6	0	4	2	0
k. Too hot or too cold in workspace	3	0	3 <i>*too hot</i> <i>*HOT</i>	5	1
l. Dry air in winter	4	0	4	4	0
m. Humid air in summer	7	0	1	4	0
n. Temperatures keep changing	5	1	4	2	0
o. Unpleasant odors	12	0	0	0	0
p. Dust or particulate matter in the air	10	0	1	1	0
q. Glare or too much light from electric light	7	0	1	4 <i>*office in afternoon</i>	1 <i>*main conference room</i>
r. Glare or too much light from daylight	8	0	2	2	1
s. Too little light for the work you	8	0	3	0	1

do <i>*poor light quality</i>			<i>*office in a.m.</i>		
t. Lack of daylight	9	0	1	0	2
u. Lack of view to the outdoors	10	0	0	0	2
v. Other: <i>None added</i>					

Note:

Respondent added additional column

One respondent questioned “*current office?*” and “*office in general?*”

One respondent stated “not here, but it could” and starred coworkers’ conversations (a.) and phones ringing elsewhere in the office (c.) noting phone conversations

7. People often adjust their environment or engage in behaviors to improve their working conditions. For each of the items below, please rate how frequently you do each activity. If it is not relevant (e.g., you don't have a door), check "Not applicable."

	<u>Rarely or Never</u>	<u>Sometimes</u>	<u>Often</u>	<u>Very Often</u>	<u>Not Applic</u>
a. Move to a more comfortable location when the environment is uncomfortable	6	4	0	0	1
b. Adjust window blinds to control light or privacy	2	6	3	0	1
c. Take a quiet break by yourself <i>*but would like to</i>	4	7	1	0	0
d. Adjust electric lighting	7	6	0	1	0
e. Open/close a window or door to control air movement	6	1	0	1 <i>*door</i>	4
f. Close door for privacy or for concentration	1	6	2	3 <i>*almo st alway s</i>	0
g. Adjust clothing when too warm/cold	2	7	2	1	0
h. Use space heater	8	2	1	0	1
i. Use a fan	5	6	1	0	0
j. Regulate the thermostat	7	0	0	0	5

					<i>*can't</i>
k. Rearrange furniture	7	4	0	0	1
l. Other: _____					

8. How satisfied are you with the level of control you have over you workspace?

Very Dissatisfied	Somewhat Dissatisfied	Neither Satisfied Nor Dissatisfied	Somewhat Satisfied	Very Satisfied
0	3 <i>*temperature control is lacking</i>	3	4	2

SECTION II. PRIVACY AND SOCIAL RELATIONSHIPS

9. To what extent are you able to:

	Not At All	Somewhat	Moderately	Very Much
a. Hold a private conversation in your workplace	0	2	3	7
b. Concentrate on your work without distractions	0	3	4	5
c. Regulate other people's access to you	1	3	2	6
d. How important is it to you to be able to have a private conversation?	0	2	2	8
e. How important is it to you to be able to work without distractions?	0	3	1	8

For this section, we would like you to identify places in the building that you go to for different kinds of activities. In the space provided, you can either note a particular room or a general location.

10. Where in the building do you go most frequently when you want to:

a. Take a quiet break by yourself?

- In my office
- Out
- Shut my door to office
- Office
- My office
- Director's office with couch when that office is vacant
- Restaurant downstairs in lobby or out to Centennial Park
- Men's room
- To the park
- GT Starbucks Coffee Shop
- My office

b. Have coffee or lunch with a friend?

- Off-site or in the building lunch room
- Kitchen
- Conference room
- Kitchen/snack bar
- Restaurant in the building
- Downstairs
- Lots of places in downtown area
- Restaurant downstairs in lobby, out to Centennial Park, or maybe break room

- Gorins restaurant
- Walk to the restaurant
- Anywhere

c. Have a private conversation?

- In an office or the conference room
- Personal office
- Office
- Office
- Office
- My office
- My office, Gorins
- Restaurant downstairs in lobby or conference room
- Office
- Close the door to my office
- My office

d. Work in a small group?

- Conference room
- Conference rooms
- Boss' office
- Conference room
- N/A
- Conference room
- Conference room
- Conference room or open area near kitchen
- Conference room
- No where to really do that
- Office or conference room

11. How frequently in the past week have you:

	Number of Times		
	0	1 – 2	More than 2
a. Eaten lunch in the building lunchroom	4	6	2
b. Taken a coffee break with a colleague	7	3	2
c. Eaten lunch alone in your office	2	2	8
d. Left the building site at lunch time	4	6	2 *5 times
e. Run into someone by chance you have been waiting to see	7	2	2

12. To what extent do you feel that the building and its grounds provide good opportunities for:

	Not At All	Somewhat	Moderately	Very Much
a. Informal social contact (e.g., coffee breaks)	1 *with outside folks	2	6	4 *with AEPI/SRE O
b. Company-wide events	2	1	5	3 *if you define AEPI/SRE O as company
c. Small group meetings	0	1	4	7

d. Rest and relaxation	2	4	5	0
e. Physical exercise	1	4	1	6
f. Spontaneous meetings and conversation with colleagues	1	1	4	6

SECTION III.**WORK-RELATED EXPERIENCES**

13. Listed below are several work-related experiences. Please indicate how frequently each experience occurs for you, on the average. Check the space on the following five-point scale that best reflects your feelings:

	Never	Rarely		Some- times		Often		Always
a. Feeling excited about your work	0	0	0	6	0	5	1	0
b. Feeling overworked	1	3	0	7	0	0	1	0
c. Being in good spirits at work	0	0	0	2	0	8	0	1
d. Difficulties sleeping at night due to worries about work	3	7	0	2	0	0	0	0
e. Feeling supported by coworkers	0	1	0	3	0	6	0	2
f. Experience headaches while at work	5	2	0	4	0	1	0	0
g. Experiencing eyestrain or blurred vision while at work	3	4	1	4	0	0	0	0
h. Experiencing soreness in your lower back while at work	1	4	0	6	0	1	0	0
i. Feeling soreness in	1	1	0	8	1	1	0	0

your neck or shoulders while at work								
j. Feeling fatigued at the end of the work day	0	2	0	7	0	2	1	0
k. Feeling fatigued during the day	1	3	0	7	0	1	0	0
l. Feeling distracted by things going on around you	0	4	0	5	0	3	0	0
m. Experiencing concern for your safety in the building	4	5	0	3	0	0	0	0
n. Feeling afraid in the building at night	4	8	0	0	0	0	0	0
o. Feeling afraid walking to your car alone after work when it is dark	3	5	0	4	0	0	0	0
p. Feeling concerned about the quality of the air in the building	1	4	0	6	0	1 *water quality!!!	0	0
q. Looking forward to coming to work	0	0	0	2	0	10	0	0
r. Looking forward to working in this building	0	0	0	2 *on ice	0	6	0	4 *current

				<i>cream day</i>				<i>*buildin g 170</i>
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Note:

Respondent added additional columns

SECTION IV BUILDING OPERATIONS

14. To what extent do you think the building design and operation show the following characteristics:

	Not At <u>All</u>	<u>Somewhat</u>	<u>Moderately</u>	<u>Very Much</u>	<u>Don't Know</u>
a. Caring for the natural environment	5	4	1	1	1
b. Energy consciousness	2	3	3	3	1
c. Opportunities for recycling	0	7	1	3	1
d. Concern for the surrounding community	4	3	2	2	1
e. Pollution prevention	3	1	3	1	4
f. To what extent does the building present a positive image?	0	1	3	8	0
g. To what extent does the building provide contact with the natural environment	5	2 <i>*visual great view</i>	2	1	2

h. To what extent does the building provide contact with wildlife	10	1 <i>*occasional hawk siting</i>	0	0	1
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SECTION V. BUILDING LOCATION AND CONVENIENCE

15. Please rate the following aspects of the building site:

	Very Poor	Poor	Fair	Good	Very Good
a. Convenience of parking	2 <i>*because of cost, not location</i>	0	1	5 <i>*but not cost</i>	3 <i>*if you have \$</i>
b. Traffic control at rush hour	2	1	5	3	0
c. Access to highways	0	1	2	7	1
d. Access to daycare <i>*One respondent answered N/A</i> <i>*One respondent answered ?</i>	3	1	1	0	0
e. Access to other services you frequently use	2	0	3	5	1
f. Access to bike or walking trails	6	2	1	0	1

SECTION VI. AESTHETICS AND FAVORITE PLACES

16. In this section, we would like you to tell us about your favorite and least liked places in the building.

a. What building characteristic or space do you think best represents the spirit of your company?

- Reception
- The inverted triangle

- The view from 31st floor
- Conference room
- Conference room's view and altitude
- Big, tall and shiny
- ????
- High and airy

b. What is your favorite space in the building?

- The waiting room outside the (previous) director's office – which is currently vacant
- Conference room
- Health club
- Near the windows
- Conference room
- Kitchen
- Office
- Looking out the window from office

c. What is your favorite space outdoors?

- The park across the street from the building
- Centennial Park
- Centennial Park
- Park next door
- Centennial Park
- Centennial Park
- Fairlie Poplar lunch district
- Woods
- The park across the street
- Park
- N/A

d. If you had visitors, what spaces would you want to make sure they saw?

- The conference room and its view of the city
- Vistas from windows
- Conference room, offices and kitchen
- View from director's office of the park
- Entire office
- The view
- Not my office
- The park and the view of the city
- Conference room
- The view from all the windows

e. What is your least favorite building space?

- An office without a window to the outside
- N/A
- Elevator
- Interior offices
- Card swipe access area
- The director's office
- N/A

SECTION VII.**ENVIRONMENTAL REPORT CARD**

17. In this section, we would like you to provide a report card for your building. For each of the topic areas, please assign a letter grade ranging from A to F. Feel free to use a plus (+) or minus (-) with the letter grade.

A = Excellent

B = Good

C = Average

D = Poor

F = Failure

	Count						
	A	B ⁺	B	B ⁻	C	D	F
a. Temperature	0	0	7	1	2	0	1
b. Air quality	0	0	5	0	4	1	0
c. Electric lighting	2	0	3	0	4	2	0
d. Daylighting	5	0	4	0	2	0	0
e. Noise conditions	0	0	6	0	4	1	0
f. Colors and décor	1	0	8	0	1	1	0
g. Public spaces	1	1	6	0	2	0	0
h. Private work spaces	5	0	6	0	0	0	0
i. Ability to control environmental conditions	0	0	0	0	5	4	1
j. Access to the natural environment	0	0	0	0	1	6	4

Notes:

Respondents added the B⁺ and B⁻ categories

One respondent added the future building must have access to mass transit – important

For item c, one respondent who rated electric lighting a D also commented “*quality OK; sustainability poor*”

For item g, one respondent put a ?

For item i, one respondent who rated ability to control environmental conditions a D also commented “*sustainability speaking*”

For item j, one respondent who rated access to the natural environment a D also commented “*unless you count the park*”